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PSYCHOTHERAPY IN SURGERY*

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Following upon long illnesses of medical and surgical nature, the convalescent often gives evidence of functional deficiencies and unfavorable psychological habits. These two varieties of ills should be prevented or corrected by physiotherapy and psychotherapy.

Every physician should recall:

1. That all morbid conditions create new habits of mind and body which are maintained by auto-suggestion. These troubles acquired during acute and particularly during chronic illnesses are in danger of becoming permanent after the local cure of the affection.

2. That "positive" feelings, calmness and optimism, are favorable to organic functions, and that "negative" feelings, agitation and anguish, produce acidosis, the presence of which is harmful to operated cases.

Pure psychotherapy is little used by the surgeon. He uses rather a mixed method where physiotherapy is joined to suggestion. Thus psychotherapy is used without the knowledge of the patient and often of the surgeon.

If, independently of professional practitioners of psychotherapy, surgeons rarely have recourse in a conscious and systematic way to this method, it is because of ignorance and skepticism, because suggestion is the oldest remedy in existence, and because the curiosity of doctor and patient is not aroused by it.

Suggestion is always efficacious. It is one of the most powerful therapeutic agents we possess. If we do not make more use of it, it is perhaps because it is always at our disposition, because its modus operandi cannot be taught to students, because we are hidebound, impatient for immediate results, and most of all because we are unwilling to make the effort to make use of it. Surely I am no more skilled in applied psychology than my ordinary colleagues, but I once read the writings of Paul-Emile Levi. Since then with entire faith in its results I have tried to use it in combination with physical means, which render the application of it very easy and more efficacious.

This mixed method is an invaluable aid in the cures of surgical cases.

We shall study it: (1) in the case of the inoperable patient; (2) in the case of those to be operated upon later; (3) in post-operative cases.

PSYCHOLOGY IN CASES WHERE SURGERY IS UNJUSTIFIABLE

Here are a few examples:

A patient seeks an operation for gastroptosis. Her stomach reaches the pubis. There is considerable emaciation. Nourishment is lessened. We notice acidosis resulting from lethargy. Operation is not advisable for the condition of decline is extreme. I order placed by the side of the patient's bed one of Pescher's spirometers, and I require her to breathe into it. She exhales 200 c.c. I explain to her that I can do nothing for her as she is too weak, but that soon she will breathe with her full lungs and will feel her strength growing.* Her attention is from now on centered on the readings of the spirometer. She notices hour by hour the amount of air she expels. I explain to her that with her increased lung capacity appetite and strength will return. This woman breathes into the apparatus every five minutes and without entering into the details of her convalescence I can inform you that in a fortnight she was exhaling two litres and that she walked home. She came to see me six months later. She was transformed. By the spirometer her lung capacity measured three litres. Her recovery was completed without an operation.

In this case the function of psychotherapy was united to that of the spirometer. I drew the attention of the patient to the spirometer, which more-

*A lecture given before the Society of Applied Psychology, Paris, November 26, 1925.

*Since the work of Georges Rosenthal we have learned of the stupendous influence of respiratory re-education on the stimulation of all the bodily functions.

over increases the quantity of oxygen and stimulates the action of the endocrines.

Continually surgeons order to bed for several weeks patients afflicted with salpingitis. What does the patient do during this period of rest? She knits, eats normally or reads novels. Her will-power grows less by lack of use, her muscles atrophy and fat accumulates. These handicaps persist after the treatment. So advise these invalids to make a systematic series of muscular efforts—to use a spirometer and exercise the diaphragm. These exercises will require about three hours of work and attention daily. When the patient gets out of bed, in—let us say—two months, she will not only not have grown fat, but she will have developed muscles and her lungs will function amply. Moreover, the necessity of motion and action in bed will have increased her will-power and will have been a discipline. Instead of a weak-willed woman or one amyotrophic or fat, you will find one who is capable of resistance and active.

THE FUNCTION OF SUGGESTION IN PREOPERATIVE CASES

Physicians who are confronted with surgical cases act variously according to the potential authority they wield. Some cause their patients to be operated on at the moment they believe right. Others seldom obtain their consent.

On what does this difference in submission on the part of the patient depend? Perhaps you will say that the men whose patients are not operated on are ignorant of symptoms and the results of operations. That is possible, though I would be inclined to blame the weakness of their motivating idea, the feebleness of their suggestive powers toward the patients. There are physicians who achieve with their patients just what they wish. Others are never listened to by theirs. On the one side the patient makes suggestions to the physician, on the other it is the physician who suggests to his patient. A competent physician, a conscientious and convincing healer, rapidly becomes the friend of his patients and these accept all his decisions whether they refer to intravenous injections of salvarsan, a long careful medical treatment, or to a surgical operation. It is the weakness of the character of the physician which causes the patient's refusal. The man who does not know how to exact obedience would have made a wiser choice of a sedentary profession with much rest and the early prospect of retirement.

THE PHYSICIAN'S LACK OF AUTHORITY IS SERIOUSLY PREJUDICIAL TO THE PATIENT

I do not need to discuss in this place surgical symptoms in general. I shall speak only of cancer and with regard to this I think no physician will contradict me. If I discuss an early intervention for megacolon, gastric ulcer, cholelithiasis, I can run into opinions encrusted in old unprogressive brains, but in attacking cancer all my colleagues will agree with me. Well, then, if we seek favorable results in the surgical treatment of cancer, early operations are indispensable. The physician must constrain his cancer patients to a rapid decision without, however, wasting them away with fear. This is just where his power of suggestion acts. Some hesitate—fearing the responsibility. The physician who allows a question of responsibility to delay him when the patient's life is in question is not a man of character. Ill fares the cancer patient whose physician is weak willed. Cancer surgery will be transformed for the better the day that the members of the profession, sure in their decisions, will know how to bring their patients to decide upon early operations. The suggestion of the physician should affect not only the patient but his whole environment. Those near the cancer patient are as so many antennæ to receive medical suggestion and transmit it to the sufferer.

SUGGESTION AS A PART OF PRESURGICAL PREPARATION

Before operating the surgeon should make a thorough examination of the patient, bringing his attention not alone to the pathological situation needing his intervention, but to his entire organism. Suppose the case to be one of appendicitis in a child. The surgeon having decided upon the operation notices in his examination that the child is a mouth breather, that he holds himself badly, that his muscles are poor, his color pale. The removal of the appendix will prevent an acute attack, but will do nothing to help the general condition.

"Your child breathes through the mouth," says the surgeon. "But, Doctor," says the mother, "we have had his adenoids removed." "For how long after the operation did he do breathing exercises?" "He has done none, but I have told him to close his mouth." Well, there is a useless operation. The throat specialist has not practiced suggestion upon the parents, nor has he exacted obedience, otherwise they would have required in their presence three-quarters of an hour of effective breathing

exercises. The surgeon in suggesting the idea of a respiratory re-education (Rosenthal) will fill the need left by the specialist.

Besides the open mouth the operator often notices thin muscles, a flabby abdomen. The family must be made to understand the necessity for abdominal exercises. "When the operation is over," the surgeon says, "the danger of appendicitis will be removed, but the child's muscular deficiency will not be corrected. Abdominal exercises must be ordered." "He has no time for exercises," says his mother, "because of his lessons." "Very well. He eats three times a day, does he not? Yes. Then take one meal away and have him do exercises for one-half hour instead. It is more important to breathe properly and to contract and expand the abdomen correctly than to eat." In view of this argument, the parents will decide to re-educate their child's abdomen.

Now, take the case of an exophthalmic goiter. Basedow's operation is helpful on condition that the patient has a thorough examination, is well prepared and operated upon under a local anesthetic. The physician must search for the underlying metabolism which may give a clue and determine the extent of the operation necessary. This may vary from the simple ligature of an artery to the removal of three-fourths of the thyroid gland. These patients are restless. First of all, their morale must be maintained. Sometimes they must be treated by isolation in the darkness, by placing near them a calm and optimistic nurse and keeping the family away. Thanks to these precautions the surgeon has the satisfaction of seeing pulse slow down, calmness return and the operation completed under the best possible conditions.

Whatever the operation may be,—goiter, stomach, appendix—the family who are in contact with the patient must be watched. Their psychological influence is very easily diagnosed. "See how pale my daughter is," says the nurse-mother. "She slept none at all last night but suffered without respite." This nurse-mother whose influence on her daughter is thus unfavorable, should at once be removed.

Another patient needs an operation for an affection of the stomach. The nurse tells the physician, "I did not wash out his stomach because he did not wish to have it done, or because he is too weary and begged to be let alone." This nurse should be replaced by another. A nurse who does not know how to require obedience is incapable of nursing. She should be sent to the linen room to hem bandages.

AFTER THE OPERATION

The precautions prescribed before the operation are now to be renewed. Now must one be on guard against the mother who declares that "her daughter has suffered and looks badly." Now one needs a calm and optimistic nurse who knows how to be silent or to speak to the point. She should as early as possible arouse the personal vanity of her patient. The man will be cleanly shaved. The woman will put on a fine chemise trimmed with pink ribbon, and these simple details of the toilet will hasten the patient to his recovery.

During this postoperative convalescence the nurse will add to her inspiring words the physical care which will restore confidence to the invalid and procure comfort and the joy of living again. Among the means to this end, rubs, massage and, above all, breathing exercises play an effective part. Spirometry is the most easily available of these agencies, not only because it oxygenates the blood, but because it requires a personal effort of special value. Friction and massage are a passive treatment which do not stimulate will-power, while voluntary deep breathing is a source of constant and beneficial autosuggestion. The patient must be shown the amount of air he exhales and this, without his knowledge, makes him repeat this autosuggestion: "Today I breathe more. I feel better than I did yesterday. My strength grows, my vitality returns, and my recovery is hastened."

I could give you the example of a young Belgian, an extremely clever fellow, on whom I operated for acute appendicitis. His intestines were swimming in pus. He was in a condition of emaciation. I made an incision in the right iliac fossa, then one in the rectum to drain a secondary pelvic ulcer. This boy was a mere skeleton. I prescribed rhythmic contractions of all his muscle groups and of the trunk and required spirometry of him. I gave him a nurse who was convinced of the value of physical means joined to suggestion. When this youth got up—three weeks later and only two days after his temperature dropped—he was just as full of resistance as one who had been twenty days on the way to recovery. Why so? Because in his bed he had not ceased to breathe deeply and to contract his muscles, nor to act for himself and make suggestions to himself. Thanks to psychotherapy and

physiotherapy he had made his recovery during the course of his illness.

I am convinced that psychiatrists will say, "You are not practicing psychotherapy, but physiotherapy." Yes, I give substance to the suggestion by a physical act so that the mind of the patient may be concentrated on a stimulative autosuggestion. The agency is twofold. Moreover, if the examples given do not suffice to convince you, I come to the re-education of those thrown out of equilibrium after abdominal operations.

PSYCHO- AND PHYSIOTHERAPY CHANGE CERTAIN SURGICAL DEFEATS INTO SUCCESSES

There is a type of ill-balanced people who complain of a falling stomach, of a floating kidney, of a uteral retroversion, of chronic intestinal stasis, etc.

Well, if you will recall the history of ptosis, you will remember the many operations which have been proposed without results; appendectomy, cholecystectomy, fixation of the stomach or a moving kidney, cecopexy, hysteropexy, or the more serious ovarectomy or gastroenterostomy. The fixing of a kidney, removal of an appendix, hysterectomy, can do no great harm, while castration for cystic ovaries or gastroenterostomy for gastric troubles without lesions, double or treble the morbid phenomena. These gastric cases operated on wrongly may still have the good fortune to meet a surgeon who will undo the operation, but for a woman whose ovaries have been removed there is nothing to do but to plant grafts of ovaries.

I do not say that ill-balanced abdominal cases do not—like others—need surgical intervention. Sometimes they even need several operations to overcome their many morbid troubles, but the surgeon prefers to attack the one which belongs to his own specialty and neglects the others. He should fight the most painful of the troubles to bring instant relief to the patient, and then attack another one if it is necessary. Invariably, if he has no recourse to psychotherapy and to physical culture, his labor is in vain. In this category of invalids needing the three treatments — physical, surgical and psychic — we meet the chronic and seriously constipated cases.

These subjects suffering from Lane's illness need a variable surgical intervention according to the case. If the diagnosis is not determined upon in a precise form the surgeon runs the risk of not benefiting the patient. But as soon as he is operated on he must in addition give him physiotherapy and psychotherapy or the result will be nil.

Lately, Pierre Duval has made a contribution towards proving that patients with long-standing intestinal stasis in whom the entire large intestine was removed developed first diarrhea and then later constipation. This is so, but this apparent failure needs explanation:

The colectomy was first accomplished, in several cases, where a less mutilating intervention should have been prescribed. For example: for subjects whose abdomens are firm and the intestinal parts are marked by fibrous adhesions, cutting these attachments followed by a well executed peritonization constitutes the chosen operation and suffices for the cure.

In certain cases short circuits or enteroanastomoses have been successful. In other cases, right-sided hemicolectomy or total colectomy is indicated.

Why then in these cases is there success after different interventions, or on the contrary failure? Because there are morbid elements which the operator has neglected to study. He has not taken the trouble to re-educate the sufferer from the physical and moral point of view. Patients of ten, fifteen or twenty years' standing have a changed metabolism, a modified nutrition. Because of a chronic poisoning their endocrines have become insufficient. They must be treated with organotherapy. A large number of them have become weak-willed or excitable. Their will must be re-educated and their erethism calmed. They have acquired the habit of pitying themselves and suffering. They must be taught to become optimists. Psychotherapy fills this rôle. It must always be joined to physical culture, to organotherapy, since these operated cases are defective in breathing, in their endocrines and muscularity. In these conditions massage, general and respiratory gymnastics are of the greatest service.

I reply to the objection made against colectomy, that those operated on have at the outset diarrhea and then become constipated as a consequence. The initial diarrhea excites the sensibility of the rectum. This providential sensibility! It should be welcomed with enthusiasm as a starting point for the clearing reflex. But the profession called for advice are in haste to prescribe! For the diarrheic surgical cases—bismuth to thin out the stools and banish the new reflexes once more which have

for years been abolished. The constipation which follows is thus of a therapeutic origin. Diarrhea would have ceased of itself and would have been reduced to two or three passages a day—several passages which must be respected for they keep awake the evacuation reflex.

PSYCHOTHERAPY MUST BE TAUGHT TO ALL PHYSICIANS, WHATEVER THEIR SPECIALTY

Psychotherapy applied by non-specialists and associated with physical means is necessarily applied without direction and without method. Thus it is perhaps less effective. It would be better for us if the psychotherapists did not busy themselves with our operated cases, our convalescents, in the effort to cure them. This desideratum is easy enough to achieve with an intelligent invalid who can understand the need of psychic re-education, but others reply to our advice of psychic treatment: "I am not crazy, nor a hypochondriac. The cause is removed, my cure should accomplish itself alone." An intelligent patient will understand that he has psychic deformities that only a mental orthopedist will succeed in banishing. Intelligent people are a minority. What shall we do with the others? Make suggestion real by physical means which moreover are indispensable for their need. The psychotherapists must arrest the attention of their patients, draw them by ultra-violet rays, *x*-rays, massage, injections, what not? That it is easier to exercise without the knowledge of the patient a psychotherapic course of action.

I have seen patients going to Swiss cures where physical care and diets were given. When the director was present the results were satisfactory. When he was absent successes were rarer. Why?

Psychotherapic action is personal. There is no psychotherapy—there are psychotherapeutists.

The inquirers of a doctor of suggestion are content with applying the physical and dietetic treatments. Necessarily their influence is diminished. I made this remark to a Swiss colleague who has a world-wide success. I called his attention to the fact that the success of psychotherapy is purely personal and I reproached certain of his assistants for having no influence on the patients. He replied thus to me: "But, my dear friend, to succeed in psychotherapy one must have a tonus, a radioactivity that not all men possess."

In brief: in medicine as in surgery there is no single treatment. The therapeutist must in every case add to the action of surgery or medicine, physiotherapy and psychotherapy if he wishes to obtain the best results.

THE KROMAYER LAMP

According to experiments made by the manufacturer, Hanovia Manufacturing Co., the Kromayer lamp emits no radiation shorter than 2,000 Ångström units or longer than 14,000 Ångström units. Of the total radiation emitted, approximately 65 per cent falls in the ultraviolet field. The apparatus is dependable, but no assertion can be made as to the properties of the rays. The company has collected the reports of results of investigations with the lamp, and supplies the references. (Jour. A. M. A., Mar. 27, 1926, p. 972.)

RADON (RADIUM EMANATION)

It has been reported that the intravenous injection of long-lived radioactive elements or the internal administration of radium, mesothorium or radiothorium is highly dangerous on account of the delayed harmful effects. This is due to the deposit of insoluble particles of these elements in the storage organs, namely, the bones, spleen and liver. These possible dangers apply to the administration of solutions of radium salts, but not to the ingestion of water charged with radium emanation (radon), since this is eliminated rapidly, the elimination being practically complete in the healthy individual in twenty minutes. (Jour. A. M. A., Mar. 20, 1923, p. 893.)

CURAY LIGHT APPLICATORS

The source of light in a Curay lamp is an incandescent tungsten filament enclosed in a glass bulb. When used in the Curay apparatus, the lamp is operated on a higher current than its normal rating carries and therefore the life of the lamp is much reduced. The spectral energy distribution of the Curay lamp is mostly emitted in the form of heat and but a small fraction of the energy is emitted as ultraviolet rays. As compared with the quartz mercury arc lamp, the amount of ultraviolet rays emitted by the Curay lamp is insignificant.

The light of the Curay lamp is not comparable with sunlight, for not only is the total amount less than that of sunlight, but a much smaller proportion of the energy is in the form of ultraviolet rays. Further, the lamp has a glass bulb which strongly absorbs the ultraviolet rays given off by the filament. An exposure of the skin in actual contact with the quartz rod "applicator" supplied with the Curay lamp for one-half hour showed no ultraviolet erythema; an exposure of three and one-half minutes at a distance of one meter with a quartz mercury vapor lamp produced a marked erythema. The Curay Company supplies letters containing an account of supposed "cures" of colds and bacterial infections, but these concern uncontrolled experiments. (Jour. A. M. A., Mar. 27, 1926, p. 971.)

CLIFFORD ALLBUTT AND MEDICAL OPHTHALMOSCOPY*

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To every man who is earnestly endeavoring to increase his knowledge of the ways and means of diagnosing disease, there comes a time when he must look back to the foundations of the structures he is building. The conception that we now hold of the causes and courses of disease is made by correlating facts with observations and impressions which in themselves are dependent on reasonable but variable indefinite factors, capable of intelligent interpretation in the light of present-day knowledge. But as observations and impressions are really the reaction of the mind of an individual to his environment, there must necessarily be divergence of opinion and ground for controversy. The builder can hardly hope to keep his structure plumb except by repeated testing with his base level; and the synthetic product of carefully annotated observations must be measured by the balance of the weight of evidence.

During the last century, the means whereby clinical, chemical, and physical phenomena are observed and measured have been drawn from the field of science as opposed to the philosophic syllogisms of the savants of previous eras, and the progress of the science of medicine has been immeasurable. The invention of instruments of precision, particularly of optical instruments, together with the adoption of discoveries in physiologic optics, has opened new fields. The trails blazed in these new lands by pioneers become paths to be used by increasing hundreds of travellers and students, and views are described from points of vantage along these trails. After a time, it becomes necessary to rechart such territory and often to readjust conceptions. The ground must be gone over with improved instruments, and closer observations made and data carefully collected and checked against data previously gathered.

It becomes appropriate from the standpoint of present-day investigations into the course of disease to look back to the foundation of one of the most useful means of observation that has been introduced into the science of medicine, that of ophthalmoscopy, and to view its present structure from the bottom up. The whole of the medical profession united in February of this year in regretting the passing of Sir Clifford Allbutt, who died at the advanced age of eighty-eight. He was the acknowledged leader of the profession in his country and had attained to this position by outstanding clinical experience, by an unrivalled knowledge of the literary side of our science and by his wonderful ability to deal with men and things.

It is said of Allbutt that "he rapidly formed a sound judgment in new work, and was ever alert to welcome the germ of a real advance; thus, in his reviews of the book on the pulse by the then (1902) little known James Mackenzie, of Burnley, he generously described it as destined to 'take a permanent place in the standard records of the subject.'" It is indeed remarkable how many matters of now common knowledge in medicine he either originated or made more widely known, although in some instances his share therein has, with lapse of time, been perhaps noticeably forgotten. In 1867, he invented the present form of the clinical thermometer. He was one of the first, if not the first, to describe syphilitic disease of the cerebral arteries (1868). He early insisted on the value of morphin in cardiac disease (1869); on the effects of strain on the heart and arteries (1870); on the use of the stomach pump and of the ophthalmoscope in medicine (1871). For many years he described hyperpiesia, or, as he originally called it, senile plethora (1895), and while so doing was largely responsible for the introduction of the sphygmomanometer into ordinary practice.

As has so often happened with important discoveries and inventions, Helmholtz' contrivance of an Augenspiegel with which to inspect the interior of the eye, first described in a monograph published in Berlin in December, 1851, seems to have been but the logical outcome of a series of interesting observations made by a number of investigators in the field of physiologic optics. But oddly enough, the problem which these investigators, with the exception of Cumming, were endeavoring to solve, and which Helmholtz himself had in mind, was not the discovery of a means by which the background of the eye could be inspected and pathologic changes situated there recognized, but a solution of the question why, under usual conditions, the pupil of the eye appears black and seems to

*From the Section on Ophthalmology, Mayo Clinic, Rochester, Minnesota. Read at the meeting of the Minnesota Academy of Medicine, Rochester, Minnesota, November 12, 1925.

emit no light, while, under certain unusual conditions, it does emit light and assumes a reddish appearance.

The luminosity of the eyes of certain animals had long been a subject of study, and many erroneous theories had been advanced to account for it; but it was not until Prevost of Geneva, about 1810, pointed out that in an absolutely dark room the luminosity disappears, was it understood that this phenomenon was due simply to the reflection from the tapetum of light which had entered the eye through the pupil. Rudolphi made a further step toward a right understanding of the matter when he showed that in order to perceive these reflected rays, it was necessary to look into the eye in a certain determinate direction. Still more important, however, and bearing more directly on Helmholtz' invention, were the investigations and observations of William Cumming and Ernst Wilhelm Bruche. At about the same time and without knowledge of the other's labors, each of these investigators had succeeded, and by similar methods, in obtaining a reflex from the background of the normal human eye. In 1847, four years before Helmholtz announced his invention, Charles Babbage, F.R.S., an English mathematician and inventor, by scraping off a little of the silvering from the back of a plain mirror, which he set obliquely in a suitable tube so that the light falling on it from an opening in the side of the tube should be reflected into the eye, contrived an ophthalmoscope which was much more like the instrument of today than was that of Helmholtz and which unquestionably afforded a better illumination of the eye. But, unfortunately, the ophthalmic surgeon to whom he showed it did not recognize its importance, and he laid it aside without making it generally known. As Helmholtz' first instrument was merely a sheet or sheets of plain glass set at an angle in a pasteboard box, it was difficult to use. He himself later said of it, "It was at first so difficult to use that I doubt if I should have persevered unless I had felt that it must succeed; but in eight days I had the great joy of being the first who saw before him a living human retina."

Among the first to appreciate the true importance of Helmholtz' invention and to acquire facility in its use were Von Graefe, to whom Helmholtz sent one of his earliest instruments; Liebreich, who was an assistant of Helmholtz at the time the ophthalmoscope was invented; Donders and Jaeger, Desmarres, Bowman and Hulke. Williams of Cincinnati (1854) spoke of the ophthalmoscope in terms of highest commendation and was the first to introduce the new instrument to the knowledge of the medical profession in this country. In answer to the question, "What has the ophthalmoscope done for ophthalmology?" perhaps a more comprehensive answer cannot be given than to say that it has done all that Helmholtz promised it would do. His prediction was that it would show alterations in the retina just as the unaided eye saw them in the cornea and iris; that it would enable us to detect congestion of the retinal vessels and inflammatory exudations on or in the retina or between it and the choroid; that it would permit us to recognize more easily and certainly the presence of high degrees of opacities of the crystalline lens and that by its aid we should be able to detect the exactness or measure the amount of farsightedness or nearsightedness; and, in short, all that dissection had shown in the dead eye it would enable us to recognize in the living one. A more striking example of prediction than his, it would be difficult to find. But ophthalmology is not the only department of medicine that is beholden to the ophthalmoscope. The specialist in diseases of the eye had hardly learned to appreciate its value before his brethren interested in affections of the brain and the nervous system began to realize how great a boon it was to them as well. Von Graefe and Sichel were among the first to recognize and point out the close relationship existing between optic neuritis and cranial diseases. Hughlings Jackson in London and Clifford Allbutt in Leeds profited by their suggestions, and were the first to approach the subject from the standpoint of the neurologist. These two men may well be called the fathers of medical ophthalmoscopy.

In 1865, Hughlings Jackson said,* "It is imperative in all cases of severe cerebral disease—at all events in cases of an acute kind, to examine the eyes with the ophthalmoscope, whether the patient complains of defect of sight or not. The intraocular condition most frequently discovered in physicians' practice is double optic neuritis; and it is very common for this condition to exist in a patient who can read the smallest type and who supposes his sight to be good. There is a morbid pathological change without a symptom."

*Royal London Ophthalmic Hospital Reports.

A prime contribution to the technical side of scientific medicine was made by Allbutt at an early stage of his career, for although no particular ophthalmoscope bears his name, no one man contributed so largely to the recognition of the value of the ophthalmoscope in the earliest days of its invention by Helmholtz. Fifty years ago, when the ophthalmoscope was a comparatively new instrument, many who employed it were too sanguine of the gains that would accrue from the recently acquired ability to see nerves and blood vessels in such immediate relation with the brain. They saw that the instrument should pave the way to an improved diagnosis of cerebral affections, and the discovery of the forms of retinitis that depend on renal or other remote disorders was hailed as sure to lead to advances not only in diagnosis, but also in pathology and therapeutics. But as time went on, those expectations became less confidently expressed, for it was apparent that the new page opened to clinical observation was not of the kind which he who runs may read. Persons unskilled in the use of the instrument, and unable to interpret the appearances that it revealed, not infrequently made and published serious blunders; they afterward neglected the help they had misused.

In the meantime, a few patient workers toiled steadily on, collecting data, comparing evidence, and eliminating sources of error. Among these workers Clifford Allbutt was one of the most prominent, and at the proceedings of various medical societies and in the columns of the various professional journals, he explained methodically the use of the ophthalmoscope, defining its range and annotating the phenomena made apparent by its use. In 1871 he brought all this work together into a connected volume which was the only existing general treatise on its subject at the time. The book, which dealt with the use of the ophthalmoscope in disease of the nervous system and the kidneys in particular, but which took note of the employment of the new system in many general disorders, began with an emphatic and personal testimony to the value of the direct image in the recognition of early and slight changes, and explained the common sources of error in interpretation. An orderly account was then given of the variations from health of the optic nerve and the retina, while the relation between these variations and intracranial and other general disorders was discussed in detail. The work was recognized from the first as full of sound reasoning founded on careful observation, never carrying conclusions further than the facts would warrant, but bringing together all the facts as far as they could be ascertained to bear on the question at issue. The book was reviewed in The Lancet just fifty-three years ago, and how much it was needed is indicated by the last words written about it, which were: "It will convince the most skeptical that the ophthalmoscope is an instrument no longer to be neglected as a means of diagnosis in general medicine."

The fourth chapter of the book is devoted to an account of the variations from health of the optic nerve and retina. In this, the distinction between anemia of the disc and atrophy is extremely well described; and the author then seeks to establish a similar difference between the mechanically congested, or strangled, and the inflamed disc; that is, between the *Stauungs-papille* and optic neuritis. It was pointed out by Von Graefe that any cause of pressure, acting on the cavernous sinus, must necessarily retard the return of venous blood from the retina; and that the resulting passive congestion would be intensified in the optic disc by the additional construction of the unyielding opening in the sclerotic. The resulting hyperemia and effusion constitute the *Stauungs-papille* and may in some cases be distinctly diagnosed from the swollen disc of genuine descending neuritis, or from the neuritis which may be secondary to venous obstruction. Allbutt applied the word ischemia to describe the condition of *Stauungs-papille*, but also gave us the English equivalent "choked disc." It is to the latter term that subsequent writers have adhered. The difference between a choked disc from pressure such as may be occasioned by the growth of an encephalic tumor, and an inflamed disc, such as may be produced by the extension of disease in a case of basal meningitis, is one readily appreciated by the understanding. As an indication of the skepticism with which his work was held it is interesting to note that a question still actively debated in the ophthalmologic societies of today was voiced by the reviewer of his book, when he stated: "We think, however, especially when it is considered that the choking becomes itself a cause of inflammation, and that the inflammation becomes a cause of effusion and proliferation, that the two conditions would with great difficulty be certainly distinguished by inspection through the ocular media and we rather doubt

whether the signs on which diagnostic inferences may be founded are very capable of being so expressed in words as to convey the same meaning to every reader. We should never be surprised to find a difference of opinion between skilled persons on the question whether the state of a given disc had been originally choking or inflammation. The difference is one highly important to be kept in view by every observer; and each one may, with advantage, seek to educate his own eye to its appreciation. But it is, after all, rather a question of minute shades of difference in the appearances present at a given time, and of the relative predominance now of one, now of another, factor, in cases in which both are present."

Within twenty years then from the time the first crude ophthalmoscopes were introduced, the foundations of our knowledge of ophthalmoscopy were laid and the relationships between the visible changes in the fundus of the living eye and constitutional disturbances were established. The first ophthalmoscopes were used for viewing the fundus by the indirect method. The image of the retina was small and the optic nerve the most prominent feature of the fundus. It is quite natural that the first definite relationships should be established about the visible changes in the optic nerve, and both Allbutt and Gowers because of their interest in neurology were quick to recognize the advantage of ophthalmoscopic examination. On one occasion, Allbutt reported on the importance of ophthalmoscopic examination as an aid in the diagnosis of tuberculous meningitis. It was his opinion that the discs were red and inflamed as a result of the extension of the inflammation along the dural sheath at the base of the brain, and that the optic nerve showed with the ophthalmoscope what one would expect to find at necropsy as a result of continued irritation without increased intercranial pressure. In this same article he recognized the infrequency with which tubercles of the choroid may be seen and stated clearly that he would not expect to find tubercles in the fundus in a case of tuberculous meningitis.

Early in his career, Allbutt was interested in diseases of the kidneys. He was one of the first to recognize and to describe changes in the fundus accompanied by diseases of the kidneys, and he has described at length changes resulting from nephritis in disease of the cardiovascular system. Allbutt's active participation in ophthalmology waned somewhat in the latter half of his active work. As the instrument became more generally used in the ophthalmic hospitals, he quoted more and more frequently from ophthalmic surgeons than from his own observations. While he did not describe the changes in the fundus that we now recognize as characteristic of certain diseases of the circulatory system, he paved the way for investigation of these diseases by his masterly work on diseases of the circulation in general, particularly on diseases accompanied by high blood pressure. In recent years, there have been described as clinical entities retinitis of arteriosclerosis of the type mentioned by Allbutt as atherosclerosis, the retinitis of nephritis, retinitis of hypertension (hyperpiesia), and the retinitis of malignant hypertension. These affections of the retina are now quite generally conceded to be distinguishable in their single form, and to exist in combination with one another and to be directly related to definite clinical findings. The retinitis of arteriosclerosis as described by Foster Moore (1917) was the first definite classification to be made from the general group of retinal disturbances that had come under the name of albuminuric retinitis.

A number of observers have from time to time called attention to characteristic changes in the caliber of the vessels and the reflex from the retinal arteries in persons having high blood pressure with evidences of disease of the kidneys, as well as in persons in whom no disease of the kidneys could be demonstrated. The line between hyperpiesia and the hypertension associated with renal disease is not clearly marked clinically, but there are certain changes in the retina that are so characteristic of hypertension alone that it is possible in many instances to infer that the kidneys are not involved.

In 1923, I published an article calling attention to two types of retinal conditions which indicate clearly a rise of blood pressure: first, the retinitis of hyperpiesia, and second, the retinitis of malignant hypertension, and pointed out the relationship between these conditions, and the superimposed evidence of renal dysfunction. Other investigators in the field of medical ophthalmoscopy have devised means of measuring directly the intraocular vascular blood pressure in both the veins and in the arteries, and have been able to correlate the ophthalmoscopic evidences of hypertension and sclerosis with the findings of the ophthalmodynamometer.

The retinal arteries normally appear immobile. The pulse excursion in vessels of such small caliber is too slight, under physiologic conditions, to be detected ordinarily. However, Kummel and De Speyr find that with the magnifying ophthalmoscope of Gullstrand, this phenomenon can almost constantly be observed.

In certain pathologic conditions, however, an arterial pulse occurs that is revealed by the ordinary ophthalmoscope. Such cases are found in glaucoma, syncope, severe anemia, and aortic regurgitation. If, while looking at the fundus with the ophthalmoscope, the observer exerts gently increasing pressure on the globe, an arterial pulse will appear. This induced pulse is particularly marked in juveniles. In the adult, the pulsation induced is less extensive, but in all cases the pulse can be noted, although in the aged it may only be observable at one point. This pulsation can be seen with indirect ophthalmoscopy, but the details are much better studied with the direct method.

As the pressure on the globe increases, so does the amplitude of pulsation, to a certain point; it then grows less, and disappears. If the pressure is further continued, the artery becomes effaced suddenly, and, blending with the tissue anemia around it, is no longer visible.

The mechanism of the arterial pulse, whether spontaneous or induced, is based on the same principle. As intra-ocular tension increases, the lumen of the artery is diminished, and when the intra-ocular tension is equal to the diastolic blood pressure within the artery, one neutralizes the other. The diameter of the artery then is that assumed by a vessel containing blood under no pressure, and kept patent only by the stiffness of its walls. The pulse wave, finding this portion of the artery thus completely relaxed, causes a maximal distention of its walls, and a correspondingly large pulse excursion. If the intra-ocular tension is increased beyond the diastolic pressure, it not only neutralizes the latter, but overcomes the stiffness of the arterial wall. In this case the pulse wave must expend part of its energy in overcoming the excess pressure on the outside, and accordingly the movements of the walls with the pulse wave are less extensive in proportion to the excess of pressure on the outside.

Normally, the diastolic pressure in the central artery is greater than the intra-ocular tension. Hence, to produce a visible arterial pulse we must increase this tension by pressure on the globe. Pathologically, the intra-ocular tension and the diastolic pressure may become more or less equalized in two ways: in glaucoma the intra-ocular tension is increased; in syncope, anemia, and aortic regurgitation, the diastolic pressure is reduced.

In eyes with normal tension, the average retinal blood pressure is 30 to 35 diastolic, and 65 to 70 systolic. Among normal persons, all other factors being equal, these findings are fairly uniform. Under physiologic conditions, the pressure in the retinal arteries is entirely dependent on systemic blood pressure and follows its variations. Knowing the systemic blood pressure one can generally safely predict the retinal blood pressure, and vice versa. Multiplying the systemic diastolic pressure by 0.45 will give the retinal diastolic pressure. If the reciprocal relation shows a variation of more than 5 to 10 mm. of mercury from that observed, the lack of accord should be noted and investigated.

There is a somewhat less constant relationship between the systolic pressures, but multiplying the systemic systolic pressure by the coefficient 0.54 generally gives a good approximation to the retinal systolic blood pressure.

The diastolic pressure in the retinal artery is already almost on the capillary level. The systolic pressure has not fallen proportionately quite so much, for to it belongs the duty of overcoming the great capillary resistance, and in this task, its energy will be quickly spent. In the capillary bed itself there is no pulse, and diastolic and systolic pressure become one.

Hypertension of the retinal vessels is most usually associated with systemic hypertension. Normally, the retinal diastolic pressure is 0.45 of the systemic diastolic pressure, but in hypertension cases, the retinal diastolic pressure is more than proportionately elevated. In three of Bailliart's cases, with respective systemic diastolic pressures of 120, 140, and 160, the retinal diastolic pressure was, respectively, 60, 80, and 86. Because the retinal systolic pressure cannot very well be measured above 150 mm. we have been unable to determine how the retinal pressure is affected in cases of extreme systemic hypertension.

I shall not discuss here the significance of these very important observations made by our new methods of examination. The self-lit ophthalmoscope may be employed by every physician with as much value as any other bit of apparatus to which he can turn his hand. In the fifty years that have

elapsed since Allbutt published his first work on medical ophthalmoscopy, many volumes have been written embodying the findings of observers all over the world. Unfortunately, the use of the ophthalmoscope has been left largely to the ophthalmologist; practitioners who otherwise pride themselves on their equipment have quite generally excluded it. Ophthalmology as a specialty has grown farther and farther away from general diagnosis and even though the oculist may be skilled in the use of the ophthalmoscope, he has not the opportunity to apply it in general diagnosis to the best advantage.

I would like to urge all physicians interested in the progress of the science of medicine as well as in the refinement of their own methods of diagnosis, to employ the ophthalmoscope with the same regularity that they use the stethoscope and the speculum, and with the same desire to add to their keenness of perception the observations which are made possible by the ophthalmoscope and the foundation so generously laid down by Clifford Allbutt.

REPORT OF THE COUNCIL ON PHARMACY AND CHEMISTRY

During the past year, the Council has carried forward its work of informing the medical profession in regard to proprietary medicines which physicians are importuned to use. The work of this body of trained men who labor untiringly and without remuneration in the cause of rational and scientific medicine deserves wider recognition and acceptance. It will receive this when physicians recognize more generally the fact that those who compose the Council have the needed specialized training to enable them, better than the average physician, to form a correct estimate of the many new medicaments appearing each year. The Council publishes the annual New and Non-official Remedies which describes the medicinal preparations that are acceptable to the Council. Products not accepted are reported on in the annual reports of the Council and these reports are collected in the Propaganda for Reform in Proprietary Medicines. In addition the Council publishes the Epitome of the U. S. Pharmacopeia and National Formulary and the book, Useful Drugs.

While the Council has brought about a revolution in the field of therapeutics, much remains to be done. The success of the further endeavors of the Council will depend largely on the support which is given by the rank and file of the medical profession. Support can be most efficiently given by physicians and with full justice to themselves and their patients by confining their use of proprietary medicines to those which have been found acceptable for inclusion in New and Non-official Remedies. (Jour. A. M. A., Mar. 20, 1926, p. 850.)

THE FORMATION OF BILIRUBIN*

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Experimental evidence pointing to the existence of hematogenous jaundice has until recently not been convincing. The observation of Mann and Magath on jaundice appearing in dogs following complete extirpation of the liver established the fact that bile pigment, at least to a considerable extent, is formed outside of the liver. A few hours after hepatectomy in dogs, the urine contains bilirubin, and there is a progressive increase in the bilirubin content of the blood, so that about sixteen hours afterward the sclerotics and mucous membranes appear jaundiced. Further work demonstrated that jaundice appeared in the absence of all of the abdominal viscera. Since the source of bilirubin was not entirely in the abdominal cavity we have looked for its formation in the extremities.

The spectrophotometric method of quantitative determination of bilirubin shows that bile pigment is present in normal dogs' blood, and small differences of concentration are readily determined. This method has enabled us to determine the bilirubin content of the arterial blood entering an individual organ of the dog, and to compare it with that of the venous blood leaving that organ.

The instrument used in these investigations was a form of spectrophotometer recently brought out by Keuffel and Esser and referred to in the literature as a "color analyzer." In essentials, it consists of a lamp-house carrying two magnesium blocks (cut from the same cake) placed at the rear; these blocks serve as sources of light. The beams of light reflected by these blocks, after passing through two suitable openings in the front of the lamp-house, enter the two receptacles, containing the solution and the solvent, respectively, which are placed in proper position in front of the slit of the spectrometer. The spectrometer proper does not differ in fundamentals from the ordinary constant-deviation type of instrument except in the presence of a biprism, placed in front of the tele-

*From the Division of Experimental Surgery and Pathology and the Section on Physics, the Mayo Foundation, Rochester, Minn. Read at the meeting of the Minnesota Academy of Medicine, Rochester, Minnesota, November 12, 1925.

scopic lens system, and an observing (exit) slit in the eyepiece. A balance in the intensities of the light transmitted by the standard cell and by the solution under examination is made by means of a sector photometer, the intensity of the light transmitted by the standard cell only being varied. In all of the experiments described in this paper, both containing tubes were 10 cm. in length. The standard cell was filled with distilled water, the other carried the solutions to be examined. This procedure was adopted in order to introduce equal quantities of glass and liquid into the two optical paths.

To obtain the experimental data, white light is passed through the two containers placed in front of the housing containing the rotating sectors and is admitted to the spectrometer. The spectrometer is set at any desired wave-length by means of a calibrated wheel. The percentage transmission of the solution for any wave-length or region of the visual spectrum as compared to the percentage transmission of the liquid (which was water in every case) in the so-called standard cell is read directly from the calibrated drum-head. This drum-head is mechanically attached to the sectored disks in such a manner as to permit of its rapid turning by hand, thus providing a quick way of varying the relative proportions of open and closed sector areas.

Much has been learned in these investigations about the criteria which must be adopted and followed in order that the spectrophotometric data may be used in deducing the final conclusions which we have reached. These criteria are clearness of blood serum and freedom from hemolysis. For, if solutions are foggy or carry fine particles in suspension, there is a marked increase in the percentage of light absorbed in the absorption zone of 500 to 430 millimicrons. Freedom from hemolysis is equally as important as clarity of serum. A single drop of hemolyzed blood added to the contents of the 10 cm. tube will produce a marked absorption in the yellow region (580 millimicrons) of the spectrum and cause an increase of approximately 40 per cent in the absorption zone characteristic of bilirubin (that is 500-430 millimicrons, or violet end of the spectrum).

In order to get some idea of the sensitiveness of the spectrophotometric determinations as compared to the van den Bergh test, we took a sample of bile from the gallbladder of a normal dog, diluted to approximately 0.000001 gm. bilirubin for each cubic centimeter (which is the limit determinable by the van den Bergh method) and found, on repeated dilution with alcohol, that we could determine quite accurately the presence of one-fiftieth of the amount which could be measured by the van den Bergh test. Comparing our spectrophotometric determinations with known dilutions of bile, we have found that we are dealing, in the experiments reported in this paper, with quantities of bile pigment varying from 0.04 to 0.015 mg. for each 100 cubic centimeters.

The results of these spectrophotometric investigations are very conclusive. The bilirubin content of blood from the various arteries throughout the body was uniform and blood from renal veins or mesenteric veins had the same bilirubin concentration as arterial blood. Definite increases in bilirubin content were found in blood of the femoral, axillary, jugular, azygos, internal mammary and splenic veins. Obviously bilirubin had been added to the blood from the regions drained by these vessels.

It was possible to reduce the number of kinds of tissue drained by the veins of the extremities by surgical removal of the bone of the leg with careful preservation of the remaining muscle, skin and fascia. After this was accomplished, the increase in the bilirubin content of the blood of the femoral vein disappeared, and the blood returning from the leg contained the same amount of bilirubin as the blood going to the extremity. This led us to believe that the bone marrow was the site of bilirubin formation in the extremities. Using a modification of Drinker's technic, we isolated the blood supply of the tibia and of the gastrocnemius muscle. Venous blood returning from the muscle showed the same bilirubin concentration as the arterial blood, while blood returning from the bone showed a marked increase in bilirubin content.

There is a large quantity of data to show that bilirubin is made from hemoglobin. Following the injection of hemoglobin into the circulation of dogs there is an increase in the amount of bilirubin in the blood returning from the spleen and from the bone marrow. After injecting small amounts of hemoglobin directly into the splenic artery we have shown that there is a definite increase in the amount of bile pigment leaving the spleen by the splenic

vein. This increase appears at from fifteen to thirty minutes after injection and continues for from thirty minutes to two hours afterward, depending on the amount of hemoglobin injected.

Besides the hemoglobin and bilirubin which appear in the splenic vein after injection of hemoglobin, a new substance may be identified by the use of the spectroscope. It has all of the photospectroscopic characteristics of hematin, and since hematin is known to be a product of the chemical distintegration of hemoglobin, it would seem that hematin is an intermediate product in the formation of bilirubin from hemoglobin. Our investigations thus far have proved that bilirubin is formed in the spleen and bone marrow, and is formed from hemoglobin; and that hematin appears as an intermediate product in the formation of bilirubin from hemoglobin.

DISCUSSION

DR. HILDING BERGLUND, Minneapolis: Looking upon the problem of bile pigment formation from an historical point of view, Virchow was the first, I believe, to find bile pigment in old hemorrhagic exudates of the pleural cavity. This type of bile pigment formation was usually conceived as a slow process. Through the highly suggestive work of Whipple, and, particularly, through the more conclusive work of Mann and his co-workers, we now know the normal bile pigment formation or the normal blood destruction —the same thing expressed in two different ways—to be a comparatively rapid process. We may now estimate in hours what we used to estimate in weeks or months.

Cushing has recently reported high concentrations of bilirubin in the dark-colored fluids of cerebellar cysts. I had the pleasure to perform the determinations and our conclusions are based on Ehrlich's old diazoreaction taking place in strongly acid solution — a reaction nowadays known as the indirect van den Bergh test. Even this more exceptional type of bile pigment formation in hemorrhagic exudates or hemorrhagic cysts probably takes place at somewhat the same rate as the normal one. Here I again refer to an observation of Cushing's: when two or three days after an operation for brain tumor Cushing again exposed the field of the operation he could observe a distinct greenish discoloration along the edges of the subdural blood clots.

Before I finish allow me to express my congratulations upon the very beautiful results just reported. The fact that it has been necessary to work out a new spectrophotometric method before the work could be carried out only adds to the pleasure to recognize the importance of the results obtained.

DR. BOLLMAN: I might follow the suggestion of both Drs. Berglund and Rowntree and point out one thing which I neglected to mention. In establishing sites of bilirubin formation in the bone marrow and spleen we have localized its formation in the organs most rich with cells of the reticulo-endothelial system. It seems probable that other cells of this system would have the same ability to form bilirubin. The formation of bile pigment from hematomas or extravasated blood is perhaps due to this same system of cells and the rate of the change of hemoglobin to bilirubin depends upon the number of reticulo-endothelial cells in the surrounding tissue as well as the concentration of the wandering endothelial cells in the region involved.

REPORT OF THE A. M. A. CHEMICAL LABORATORY

During the year, the Laboratory has been engaged largely in evaluating synthetics and drug preparations for the Council on Pharmacy and Chemistry and in analyzing nostrums for the Bureau of Investigation. The work which the Laboratory does for the Council on Pharmacy and Chemistry is becoming increasingly involved and difficult. Similarly the analysis of patent medicines for the Bureau of Investigation is more complicated than formerly. The Laboratory also carries out independent investigations: thus it has published a report on the quality of the market supply of cinchophen, a study of bismuth compounds and a study of liquid petrolatum-agar mixtures. The value of a chemical laboratory maintained by the American Medical Association is thoroughly demonstrated when comparisons are made between conditions existing in this and other countries. While abroad certain proprietaries are claimed to have this or that chemical structure, these claims are not made for them here when their composition has been shown to be otherwise. (Jour. A. M. A., Mar. 20, 1926, p. 851.)

THE DEFEAT OF THE STREPTOCOCCUS IN MEASLES, ERYSIPELAS AND PUERPERAL SEPSIS

When the announcement was made that the Drs. Dick had shown that scarlet fever is a disease similar to diphtheria in that the streptococcus elaborates a toxin which is the causative agent, medical philosophers predicted that other investigators would soon reveal similar causative agents for related diseases. It appears likely that these predictions are to be realized within the current year. Now Ferry and Fisher report that they have elaborated a skin test for measles with toxin prepared from an organism found in the blood of patients suffering with this disease. Experiments are also being made with streptococci associated with erysipelas and puerperal sepsis and preliminary reports indicate the possibility of similar success.

Moreover, other organisms than the streptococcus are being studied with relation to toxin production, notably the staphylococcus and more recently the tubercle bacillus. If these investigations are confirmed, it may well be that the present decade will pass into history as the one that saw the streptococcus defeated by medical science. (Jour. A. M. A., Mar. 27, 1926, p. 955.)

PROGRESS IN THE STUDY OF THYROXIN*

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Eleven years ago, thyroxin was isolated in pure crystalline form. After the chemical structure of thyroxin had been established, two questions remained unanswered. The first is: What part of the molecule is responsible for the physiologic action? The second is: What is the relation between thyroxin and other substances which are involved in the processes of oxidation in the animal organism? In order to answer the first question it became necessary to produce thyroxin synthetically and also to make a series of closely related compounds. With these substances it was hoped that the mechanism by which thyroxin functions could be established.

The synthesis of thyroxin is a hazardous undertaking, and without any assurance that the compound could be made synthetically the work became an adventure in the field of pure organic chemistry. The reward for the synthesis, however, was a stimulus sufficient to insure the completion of the work. One difficulty with the synthetic preparation of thyroxin is the fact that the answer cannot be known until the objective is accomplished. It may be compared to the cornering of the wheat market in the business world. Until the crisis is over, one can never know that the wheat market has actually been cornered. The same suspense is experienced in the synthesis of any organic substance.

The synthesis of thyroxin has not yet been accomplished but I have recently secured evidence which confirms the structural formula assigned to thyroxin and have prepared a compound which is thyroxin in every detail except that 3 atoms of bromin are in the positions occupied by the 3 atoms of iodin. This substance, tribrom thyroxin, possesses chemical properties which are surprisingly similar to those of thyroxin itself, and the method of its preparation serves as a proof of the correctness of the formula assigned to thyroxin. Therefore, the only remaining problem connected with the synthesis is to prepare the substance containing the 3 atoms of iodin instead of the 3 atoms of bromin. I have advanced nearly to completion with this problem and am no longer concerned with the question as to whether or not it is possible to make thyroxin synthetically. It is possible to make it.

When thyroxin is administered to a person deficient in thyroid substance the production of energy is profoundly affected; it can be shown that thyroxin is responsible for 40 per cent of the basal metabolism. It therefore becomes evident that, if the mechanism responsible for the activity of the thyroid can be established, a key will be secured which can be used to explain the action of other substances.

During the synthetic work on thyroxin a series of new compounds with unique properties has been produced. This group of substances can exist in two forms: an oxidized and a reduced form. We now have evidence that thyroxin is a member of this group of compounds, and can therefore say that the physiologic action of thyroxin is due to the fact that the molecule can exist in these two states. The processes involved in the oxidation and reduction of thyroxin are linked inseparably with the mechanism of oxidation in the cells of the body which lead directly to the production of energy.

After it has been shown that the physiologic action of thyroxin is based on the alternate loss and acquisition of 2 atoms of hydrogen, the problem broadens to include the probable mechanism of the other substances which assist in oxidation. The first of these other compounds to receive attention was epinephrin. By working with a series of substances closely related to epinephrin, I have now shown in quantitative and convincing manner that the secret of the activity of epinephrin is the production within the molecule of a chemical grouping which is identical with the grouping responsible for the activity of thyroxin. Epinephrin can exist in an oxidized and a reduced form, and it fits into the process of oxidation in the cell in a manner which is very similar to the functioning of thyroxin. The close relationship between these two substances is shown by the following structural formulas which give the cycle of changes in the respective molecules.

The cycle of the chemical reactions in the thyroxin molecule when it functions as a catalyst, showing the formation of the nitrogen bond in the open-ring form, the closure of the pyrrolidone ring and reduction of the nitrogen bond.

The cycle of the chemical reactions in the adrenaline molecule when it functions as a catalyst, showing the formation of a bond through the hydrogen of the methyl amine group.

*From the Section on Biochemistry, Mayo Clinic, Rochester, Minnesota. Read before the Minnesota Academy of Medicine, Rochester, Minnesota, November 12, 1925.

It has been shown that thyroxin and epinephrin produce a profound effect on the rate of energy production of the body, but there are many other substances whose physiologic activity undoubtedly belongs to the same type of reaction. Among these are glutathione and, in all probability, vitamin B. A less important member, but of great theoretic interest, is bios. I have investigated glutathione and shown that it acts in essentially the same manner as thyroxin and epinephrin but at a much lower intensity. I am now engaged in studying the manner of functioning of vitamin B and bios.

From the work carried on thus far, it becomes evident that thyroxin is one member of a group of substances which affect the rate of oxidation in the animal organism. The action of thyroxin can be compared to the pressure or voltage in the electric light system. When you are running an automobile, the headlights are bright, but when you stop there is a perceptible dimming or a lessening in the amount of light produced in the electric light bulbs. The only thing which has happened in the electric light system is a lessening of the pressure or voltage. In a similar manner, when thyroxin is removed from a functioning cell in an animal organism, the intensity of oxidation is lowered, resulting in a decreased rate of oxidation, but no fundamental change in the essential process of oxidation. Restoring thyroxin to such a cell restores the functioning intensity or pressure of oxidation and the cell again increases its rate of metabolism, returning to a normal status.

CEANOTHYN NOT ACCEPTABLE FOR N. N. R.

Ceanothyn is the name applied by Flint, Eaton and Co., Decatur, Ill., to a liquid extractive prepared from the bark of the root of Ceanothus americanus (Jersey tea). Ceanothyn was recommended "for the control of hemorrhage, in surgical procedure, postpartum hemorrhage, pulmonary hemorrhage, epistaxis, and disturbed conditions during the menopause." The Council on Pharmacy and Chemistry found Ceanothyn unacceptable for New and Non-official Remedies: (1) because its composition is uncertain, (2) because no tests are furnished to control its identity and uniformity, and (3) because no satisfactory evidence for its therapeutic value had been submitted. (Jour. A. M. A., Mar. 20, 1926, p. 890.)

STUDIES ON POLIOMYELITIS: RESUME AND NEWER FINDINGS*

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Among the numerous questions concerning poliomyelitis, only one may be regarded as entirely settled: that the causative agent is a filter-passing virus. Little is actually known concerning the origin and nature of this virus. Flexner and Noguchi have cultivated small globoid bodies from poliomyelitic material with which they succeeded in producing poliomyelitis in the monkey, *Mecaccus rhesus*, on intracerebral inoculation. This result has never been corroborated so far as the production of the disease in monkeys is concerned.

Immunity in poliomyelitis, as Flexner has pointed out, does not follow injection of virus and develops only in man and the monkey as they recover from attacks of poliomyelitis. The anaërobic globoid bodies of Noguchi and Flexner, as Amoss has shown, have little or no immunizing power. Except for serum from convalescent human beings and monkeys, the work along these lines has given us nothing for the prevention or the specific treatment of this disease, and the use of such serum is obviously impracticable except in a few selected cases.

The discovery that typical poliomyelitis can be produced in the monkey with virus and filtrates of virus[2,5] was considered final in proving that bacteria of ordinary size had no etiologic relation to this disease. However, prior to that time, a somewhat peculiar diplococcus or streptococcus had been found in spinal fluid and in brain and cord, and in some instances injections in animals gave suggestive, although inconclusive, results. Since these early studies were made, special methods have been developed and bacteria of ordinary size have been isolated repeatedly from diseased tissues which were formerly considered sterile. The localization of these bacteria in animals frequently correspond to that of the lesions from which they were isolated. In view of the extremely specific effects obtained in my studies in elective localization, I considered the earlier investigations as inconclusive proof that bacteria of ordinary size had no etiologic

*From the Division of Experimental Bacteriology, The Mayo Foundation, Rochester, Minnesota. Read before the Minnesota Academy of Medicine, Rochester, Minnesota, November 12, 1925.

relationship to poliomyelitis; and accordingly, in July, 1916, I began to restudy the bacteriology of poliomyelitis by the use of the newer methods. I shall review briefly here the results obtained, in order to emphasize their significance and to report newer findings which bear closely on the etiology of poliomyelitis.

A pleomorphic streptococcus has now been consistently isolated from and demonstrated in affected tissues in all cases of acute poliomyelitis that have occurred in different epidemics and in widely separated parts of the country. The organism has been found in large numbers in adenoids and tonsils, in smaller numbers in lesions in various parts of the central nervous system, and in the mesenteric lymph nodes.[8] It has been proved to be absent in organs and areas showing no lesions. The organism shows great variation in size and shape, depending on the method of cultivation. In aërobic cultures, although more irregular in size, it closely resembles ordinary green-producing streptococci or pneumococci of low virulence. Under anaërobic cultivation, especially in tall columns of ascites fluid with tissue and oil, it attains a very small size,[11] becomes filtrable, and in many respects appears identical with the globoid organism described by Flexner and Noguchi. The variations noted in cultures have been proved not to be due to contaminations or to mixed cultures. All gradations in size between large coccus or diplococcus forms to exceedingly small, almost ultra-microscopic forms, have been found alike in cultures and in the tissues, and the conditions favorable for the formation of one from the other have been determined. Morphologic evidence of the breaking down of large forms into the small forms in the tissues has been obtained. Pure cultures of this organism have been isolated many times, even from filtrates of nasopharyngeal washings and freshly made emulsions of brain and cord from cases of acute poliomyelitis, and it has been demonstrated in films and sections of brain and cord many months after they were placed in 50 per cent glycerol. It is constantly present in the diseased tissues, from which it can be cultivated even after many months in glycerol. On injections of fresh cultures into young rabbits and guinea-pigs it localizes specifically in the nervous system and produces flaccid paralysis and changes in brain and cord, which resemble those of poliomyelitis in man.[12] From the brain and cord of these animals the organism can be isolated and the disease again produced. The organism has been rendered filtrable. By means of the same methods the identical organism has been isolated constantly from the brain and cord of monkeys paralyzed with fresh, glycerolated and filtered virus. The serums of human beings and of monkeys, after recovery of the animals from poliomyelitis, agglutinate specifically the more sensitive strains both from human beings and monkeys with poliomyelitis.[10] Injections of the recently isolated aërobic cultures into monkeys render them refractory to virus. The aërobic form of the organism from human beings and monkeys with poliomyelitis produces antibodies in the serum of horses, in a large amount common for both, cross-agglutinating these strains specifically in high dilution. This serum has been found in some instances, but not in all, to protect monkeys from paralysis following injection of virus and to neutralize virus in vitro. It has also been found useful in the treatment of poliomyelitis in man in a large number of cases.

The results of Flexner and Noguchi, so far as the cultivation of a small filtrable organism and its demonstration in the tissues in cases of poliomyelitis are concerned, have been corroborated, but the results of my experiments indicate that this is the anaërobic and, according to Amoss' results, a non-antigenic form of the organism which, under aërobic cultivation, clearly belongs to the streptococcus group of microörganisms. Both forms have been constantly demonstrated side by side and sometimes in the same chain, in the tissues in cases of poliomyelitis. The streptococcus occurs in places where virus has been demonstrated to be present: the nasopharynx, tonsils, lymph nodes and spleen, central nervous system and liver; and is absent where virus is absent: kidney, heart and lungs, spinal fluid, blood and urine. Flaccid paralysis, coming on soon after injection, has been produced in monkeys with characteristic although not typical changes in the cord with aërobic cultures, but the classic picture, as obtained with virus in this species, has not been secured. The rabbit and guinea-pig are highly susceptible to the streptococcus, the monkey highly resistant, while with virus the conditions are reversed. It may be suggested, on the basis of results obtained, that inability to produce typical poliomyelitis in the monkey with this streptococcus may be due to a relatively high natural immunity as well as to the develop-

ment of immunity, since the organism in the aërobic form has marked antigenic powers.

Similar results have been obtained consistently during different epidemics of poliomyelitis as well as in sporadic cases since 1916. Mathers and Nuzum and Hertzog obtained similar results, and Hektoen, Mathers and Jackson have also demonstrated the presence of this organism in the lesions in a series of cases of poliomyelitis. Through intracerebral inoculation of small amounts of suspensions of nasopharyngeal swabbing, I have been able to isolate the pleomorphic streptococcus consistently not only from the throats of persons ill with poliomyelitis but in contacts and normal persons at the time of epidemics, and have proved its absence in the throats of persons after recovery and in the throats of normal persons in the absence of epidemic poliomyelitis. Thus the throats of forty-four persons (nineteen patients with poliomyelitis and twenty-five normal controls) in whom the organism was demonstrated in the throat during the epidemic of poliomyelitis in 1921, were reexamined one year later when there were no cases of poliomyelitis. Flaccid paralysis was produced in rabbits, with recovery of characteristic streptococci, by material from only three persons. Similar results have been obtained during several additional epidemics since that time.

The demonstration of the presence of the characteristic streptococcus in throats by means of animal tests is a laborious task. The symptoms are not always characteristic, and specificity of the streptococcus, as measured by its agglutinating reactions, may disappear rapidly.

THE POLIOMYELITIS PRECIPITIN REACTION

Last year a simple method for proving the presence of the organism of poliomyelitis in the throat was evolved,[9] namely a precipitin reaction with the cleared nasopharyngeal extracts and the poliomyelitis antistreptococcus serum. In this study, a high incidence of positive reactions was obtained not only in cases of poliomyelitis (83 per cent) but also in normal contacts (77.5 per cent), in persons ill with various diseases (65 per cent), with scarlet fever (24 per cent), and in normal persons within the epidemic zone (59 per cent); whereas a uniformly low incidence was obtained in the three control groups outside the epidemic zone: persons ill with various diseases 4.8 per cent, with scarlet fever 9.5 per cent, and in normal persons 5.5 per cent respectively. Further studies with the precipitin reaction during the past summer in connection with three epidemic outbreaks, corroborate fully those obtained last year, and have extended our knowledge of the relationship of the streptococcus to poliomyelitis in important respects. It was found among other things, that as poliomyelitis appears in epidemic form this streptococcus becomes prevalent not only in the throats of persons ill with the disease but in throats of persons generally, and as the epidemic disappears, the organism likewise disappears. Thus, the precipitin reaction in 102 persons swabbed prior to the occurrence of the first case in Rochester, including two families in which one child of each had abortive poliomyelitis, was positive in only fourteen, whereas during the period of the epidemic the incidence of a positive reaction averaged 70 per cent of 632 persons swabbed. During the three weeks following the occurrence of the last case, in only 13 per cent of 265 persons swabbed were reactions positive. Similar results were obtained in persons in whom the test was made before, during and following the epidemic. The results in family groups in isolated rural districts in which no case of poliomyelitis developed and in which contact could not be determined, were of particular interest. A high percentage of positive reactions was obtained in these at the time of the epidemic, whereas several weeks after the epidemic had disappeared, the precipitin reaction was nearly always negative. In a number of instances, all persons in families that had left the epidemic zone before poliomyelitis appeared and who returned during the epidemic reacted negatively and even those who had no direct contact with other persons, reacted positively within five to seven days after their return. It was also found that the precipitin reaction in persons who had had poliomyelitis previously and whom we knew to be immune to a second attack, was usually positive during the epidemic and negative after the epidemic had subsided. The prevalence of this streptococcus, even in the throats of persons who have recovered from poliomyelitis, at the time of epidemics, suggests strongly that to prevent poliomyelitis in the susceptible, it will be necessary to find a method of specific immunization. The incidence of the disease indicates clearly that certain children are naturally immune and that, through abortive attacks or otherwise, a large percentage of the population becomes immune with increasing

age. The need, therefore, for a method to determine susceptibility is very great. Attempts along this line have been made from time to time, but until recently without success.

SKIN TEST

In preliminary tests with various antigens it has been found that strains of the streptococcus freshly isolated from poliomyelitis and which produced flaccid paralysis in rabbits, yield suitable toxic antigens when grown for twenty-four hours in pancreatic digest broth to which approximately 10 per cent of ascites fluid is added at the time of inoculation. The culture is sterilized by adding 0.5 per cent phenol or cresol. It was found that 0.1 c.c. of a 1:100 dilution in sodium chlorid solution of the killed culture injected intradermally, approximates the optimal dose. Absence of redness at the point of injection of the test substance at the end of from eighteen to twenty-four hours is considered as negative, redness limited to the area injected is recorded as +, redness extending beyond the blistered area approximately 1 cm. in diameter, as ++, redness from 1 to 2 cm. in diameter, as +++ and larger areas usually from 2 to 3 cm. (more rarely 4 cm. in diameter), as ++++. The reactions of + and ++ are considered as mildly positive and those of +++ and ++++ as strongly positive. The control injection consists of a dilution of 1:100 of the corresponding uninoculated broth. This has always given negative results or only slight redness limited to the area blistered at the time of the injection.

Thus far, the skin test has been made on twenty-eight persons who had recovered from attacks of poliomyelitis from four weeks to years previously. Of these, twenty-one gave a negative reaction and seven a mildly positive reaction. All of three patients with poliomyelitis gave strongly positive reactions during the acute attack, while two of these reacted negatively a month later. One gave strongly positive reactions on the third day of illness, mildly positive reactions eight days later, and negative reactions four weeks after the onset of the attack. Nine persons, mostly children, who had what was considered abortive attacks of poliomyelitis during the recent epidemic, were tested from five to eight weeks later. Six gave negative and three mildly positive reactions. The results in controls, chiefly in family groups in whom no illness suggestive of poliomyelitis had occurred, were as follows: strongly positive in twenty-five cases, mildly positive in eighteen, and negative in seventeen. Of forty-five children from five to ten years of age at an orphanage, 73 per cent gave a strongly positive reaction, and of the remaining thirty-one children from eleven to sixteen years of age, 45 per cent gave a strongly positive reaction. Of ninety-eight high school pupils ranging from fourteen to nineteen years of age, only 28 per cent gave a strongly positive reaction.

The incidence of a positive skin reaction according to age, therefore, judging by these preliminary experiments, corresponds in general with the age incidence. In some instances persons with marked residual paralysis have reacted negatively to undiluted cultures to which those highly susceptible reacted positively in dilutions as high as 1:1000. The skin reaction with the poliomyelitis antigen appears specific, the incidence of positive reactions with similar antigens prepared from other strains appears as high in persons that have recovered from poliomyelitis as in normal controls. The skin of most rabbits has been found susceptible while the skin of seven monkeys of the species *Mecaccus rhesus*, of five Java monkeys and two baboons, has been found insusceptible, results in agreement with the difference in susceptibility of these animals to infection by the streptococcus.

Numerous questions regarding the nature of the reaction have not yet been worked out. However, the immune serum prepared with the pleomorphic streptococcus, which has been used successfully in the treatment of the early stages of poliomyelitis, has marked neutralizing power over the toxin, as determined by the skin reaction. Further work is in progress.

BIBLIOGRAPHY

1. Amoss, H. L.: The cultivation and immunological reactions of the globoid bodies in poliomyelitis. Jour. Exper. Med., 1917, xxv, 545-555.
2. Flexner, Simon, and Lewis, P. A.: The transmission of acute poliomyelitis to monkeys. Jour. Am. Med. Assn., 1909, liii, 1639.
3. Flexner, Simon, and Noguchi, Hideyo: Experiments on the cultivation of the microörganism causing epidemic poliomyelitis. Jour. Exper. Med., 1913, xviii, 461-485.

4. Hektoen, Ludwig; Mathers, George; and Jackson, Leila: Microscopic demonstration of cocci in the central nervous system in epidemic poliomyelitis. Jour. Infect. Dis., 1918, xxii, 89-94.

5. Landsteiner, K., and Levaditi, C.: La transmission de la paralysie infantile aux singes. Compt. rend. Soc. de biol., 1909, lxvii, 592-594.

6. Mathers, George: Some bacteriologic observations on epidemic poliomyelitis. Jour. Am. Med. Assn., 1916, lxvii, 1019.

7. Nuzum, J. W., and Herzog, M.: Experimental studies in the etiology of acute epidemic poliomyelitis. Jour. Am. Med. Assn., 1916, lxxii, 1205-1208.

8. Rosenow, E. C.: Etiology of epidemic poliomyelitis. Jour. Infect. Dis., 1918, xxii, 281-426.

9. Rosenow, E. C.: A specific precipitin reaction in epidemic poliomyelitis. Jour. Am. Med. Assn., 1925, lxxxiv, 429-432.

10. Rosenow, E. C., and Gray, Hazel: Agglutination of the pleomorphic streptococcus isolated from epidemic poliomyelitis by immune horse, human, and monkey serum. Jour. Infect. Dis., 1918, xxii, 345-368.

11. Rosenow, E. C., and Towne, E. B.: Bacteriological observations in experimental poliomyelitis of monkeys. Jour. Med. Res., 1917, xxxvi, 175-186.

12. Rosenow, E. C., Towne, E. C., and v. Hess, C. L.: The elective localization of streptococci from acute poliomyelitis. Jour. Infect. Dis., 1918, xxii, 313-344.

SAFEGUARDING THE PUBLIC

A hearing recently was held in New York state on a new bill which not only provides for registration of all duly licensed practitioners but requires annual reregistration, to be kept by the board of regents and to be available to medical and health agencies in every county. This will allow a check-up on all physicians in the state every year and those deemed unworthy will not be reregistered.

To make the penal provisions of the bill more effective, it transfers the prosecuting duty from the county district attorneys to the attorney general and places such cases in the Courts of Special Sessions.

Another safeguard is the establishment of a Grievance Committee which is charged with the duty of sifting evidence as to unprofessional and illegal practices on the part of licensed physicians and of submitting recommendations to the Board of Regents as to the revocation of such licenses. The Grievance Committee is to be appointed by the Board of Regents, in part, after suggestions from the State Medical Societies.

The next Minnesota legislature will do well to consider this bill. Such an act is needed in this state where the abuses of quacks and unethical licensed practitioners are becoming more flagrant. The reregistration and other features of the bill would go a long way toward correcting this evil.—*Northwestern Health Journal*, March, 1926.

CYSTS OF THE THYROGLOSSAL DUCT*

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I have been asked to speak tonight about an operation which we have used for a few years in operating on cysts and sinuses of the thyroglossal tract. The results obtained by this type of operation have been very much more satisfactory than by any previous method which we have used in operating for this condition.

Very early in fetal life the thyroid gland develops at the base of the tongue and descends in the median line of the neck to its normal position. Normally, the epithelial lining of the tract through which the thyroid descends becomes obliterated. If this fails to occur, cysts may develop along its course.

The diagnosis of cyst or sinus of the thyroglossal duct is, as a rule, not difficult and it is made by recognizing a rather firm cystic tumor or a sinus in the median line of the neck usually near the hyoid bone or the tip of the thyroid cartilage. Occasionally, however, a cyst or a sinus tract may be found in the median line as low down as the sternal notch. Usually, the duct, which runs from the cyst to the hyoid bone, may be easily palpated.

The highest percentage of cures is obtained when the entire epithelial-lined tract is removed. As a rule, the cyst and the portion of the tract lying below the hyoid bone may be dissected out without difficulty, but above the hyoid bone the tract is so small and friable that it is broken off easily and consequently is difficult to remove. Many recurrences come through failure to remove the portion of the epithelial-lined tract which passes through the tongue to the foramen cecum.

The operation is usually performed through a transverse incision about 5 cm. long across the neck at the level of the hyoid bone. The skin and platysma muscles are reflected. The cyst is usually found lying underneath the raphe connecting the sternohyoid muscles. It is dissected free up to the hyoid bone. At this point the tract usually passes above, below or through the hyoid bone and, for this reason, a small portion of the center of the hyoid bone is removed; then, no attempt being

*From the Section on Surgery, Mayo Clinic, Rochester, Minnesota. Read before the meeting of the Minnesota Academy of Medicine, Rochester, Minnesota, November 12, 1925.

made to isolate the duct, the tissues are cored out through the muscles of the tongue directly to the foramen cecum, and the duct with the tissues surrounding it for a distance of about 3 cm. on each side is removed. In doing this, it is necessary to keep clearly in mind the course of the thyroglossal duct. This corresponds to a line drawn at an angle of 45 degrees backward and upward through the intersection of lines drawn horizontally and perpendicularly to the superior central portion of the hyoid bone. The removal of the portion of the duct lying above the hyoid bone may be more easily accomplished if the tongue is pulled upward after the segment of hyoid bone has been removed and a finger is introduced into the mouth in such a manner as to push the foramen cecum upward and forward toward the hyoid bone. The foramen cecum may be located through following the two rows of circumvallate papillæ which lie on each side of the tongue; these join in the median line just anterior to the foramen cecum. By pushing the foramen cecum forward the distance between it and the hyoid bone is considerably shortened, and the finger acts as an excellent guide to prevent entrance to the pharynx during the dissection.

In the dissection, the duct, a portion of the hyoid bone, a portion of the raphe joining the mylohyoid muscles and a portion of the geniohyoglossus muscles are removed and the dissection is carried up to the mucous membrane of the tongue covering the foramen cecum, at which point the duct is cut off. The opening in the geniohyoglossus muscles is sutured with interrupted catgut sutures, and the tissues surrounding the cut ends of the hyoid bone are brought together with chromic catgut sutures in such a manner as to approximate the edges of the bone. A small rubber tube is introduced to this point and the skin closed.

Since this type of operation has been employed in the Clinic, all of the patients operated on, so far as I have been able to ascertain, have been cured, whereas previously operative procedures often failed to effect a cure.

DISCUSSION

Dr. Arnold Schwyzer, St. Paul: I think this is a very good procedure, only I am surprised that the Doctor said there were so many failures before. I have operated on a number of these; they were thyro-glossal duct fistulæ and a few cysts. When you come up to the hyoid—if you know what these cysts and fistulæ are due to—you also know it is very probable that the tract runs further on.

For a good many years I took out a part of the hyoid bone in these cases and followed the cord-like tract up into the tongue, at times practically to the mucosa.

One of my assistants not long ago noticed on his own neck what he thought was a lymph gland. He is about forty-five years old. When we started to remove the thing, we did not think it was anything else than a lymph gland; it turned out to be a cyst connected with the hyoid bone. We operated under local anesthesia. The hyoid bone was resected and the tract followed clear to the mucosa of the tongue. It came natural to try to get the tract out in its entire length. Taking some of the surrounding tissue gives you a chance to pull; the tissues then hold.

In my work I did not always go as far as the Doctor stated, but I must have been lucky. Not all the cases seem to exactly need this thorough procedure. There is, however, no question but what the method described by Dr. Sistrunk is the proper way to operate on these cases.

April 14, 1926.

To the Editor:

I have gone over the article on Copenhagen Snuff (editorial, this issue) and find it covers the ground. The North Dakota Agricultural Bulletin, September, 1913, gives a complete analysis of the ash of Copenhagen and Right-Cut tobacco, and I find they agree fairly closely. The amount of nicotin in these products showed a higher per cent than the Fine-Cut tobacco, tobacco leaves and Stag Smoking tobacco, which they analyzed, 1.3, 1.94 and 1.69 per cent, respectively. The percentages of nicotin in two samples of Right-Cut were 3.49 and 3.75, respectively, and in Copenhagen, 3.27 per cent. I give you this in case you may not have seen this Bulletin. * * *

Since there is a general sentiment against legislation which some people feel is taking away their liberty or rights as they consider it, I am of the opinion that more can be accomplished by education than by force. Articles of the nature of this editorial, coming from the medical profession which does not pose as critics, and are not seeking notoriety or public favor, will carry weight and give food for thought which I feel cannot be accomplished by legislation.

If this editorial were copied and published in the daily press, it would surely attract attention, especially by the users of snuff, and they would not look upon it as propaganda against what they consider their rights. If they have ordinary intelligence, they should profit by the knowledge imparted; if not, society will not miss them when they are gone.

Sincerely yours,

E. D. Brown.

SURGERY IN THE HOME*

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Long Prairie, Minnesota

A paper on surgery in the home at the present stage of evolution when almost every small town supports a well equipped hospital and when nearly every farmer owns at least a Ford, seems rather unnecessary to present to a body of physicians such as this, and in responding to the request of the committee to give something along this line, I thought the relating of some of my early experiences of work done in the home and an account of one or two later cases might be of interest to at least the younger members of the profession who have never been without help of some kind and have always had at their command an up-to-date hospital.

Let me recount hastily the status of medicine in 1882 when we were turned loose to practice our profession on an unsuspecting public. Medicine looked at from our present status was then seemingly in its infancy. It was the time when aseptic surgery was unknown, laudable pus was the great desideratum, and a laparotomy was practically never done. Never during my three years at Rush did I witness an abdomen opened. The germ theory of disease was just beginning to be accepted and it was the proof that suppuration of wounds was the result of microbic infection which made the great turning point in the history of surgery. Then came antiseptic surgery for a period with its carbolic acid spray at the site of the operation while the surgeons operated in their every-day clothes, all this giving way in time to today's aseptic surgery.

It was a time when in chemistry the raising of bread by yeast was thought to be a chemical process, when the elements numbered about seventy instead of ninety-two, when the atom was an indivisible particle of matter and not, as we now know it to be, a simple manifestation of electricity, a little universe in itself, a nucleus surrounded by its attendant satellites. The cause of tuberculosis was unknown and it was at a much later date that the cause of puerperal fever from which thousands of mothers died annually was discovered and its prevention adopted. Likewise the causes of diphtheria, typhoid, yellow fever and malaria and the long list of germ diseases of today were not known.

We had to fight these terrible diseases as best we could while we constantly exposed ourselves to their infectiousness. We, who are country practitioners, are apt to deplore being handicapped in our early practice by reason of lack of resources in our armamentarium, but as I look back at it all now I cannot but feel that many of the disappointments and predicaments that were forced upon us were blessings in disguise. We were forced to be more resourceful. We had to have more initiative and we became more skillful by reason of our experiences. We had to think as conscientious physicians, there was a life at stake, and there was no help but ourselves. We early saw that to do anything but the simplest surgery we had to have help and fortunately this predicament being forced on the three physicians then located in our town, we agreed to assist each other in any of our cases. We undertook and performed operations that otherwise would have been impossible and the result was that we saw more surgery, we talked more surgery and did more surgery. Our practice became more profitable. There was a more friendly feeling between the physicians and there was less gossiping amongst the laity.

It has been said that any successful business is the reflection of some one mind, and so, in surgery, one head should direct, one should command. And when one develops the surgical sense of cleanliness by always practicing it, no matter where he is he can find ways and means to practice aseptic surgery. If forced to do major surgery in the home, there is usually some one room that can be used by disrobing it of its many chromos, its shades and curtains, flower pots and furniture, wetting and mopping up the floor, while the family boiler will sterilize your paraphernalia, even your instruments, if necessary. To those willing helpers, the neighbors, who are always present there should be issued the injunction of "hands off" except for the crudest work.

It was in this way that all of our early surgery was done. Not according to the accepted technic of today, for that is the acme of forty years of evolution. Those early experiences show that good

*Read before the Annual Meeting of the Northern Minnesota Medical Association, Brainerd, Aug. 24-25, 1925.

surgery can be done almost anywhere if you take great pains.

My first appendix case was thirty years ago, twelve miles in the country, on a lad of thirteen years. I was all alone save a drayman, who held the ether can. My intention was to remove the appendix, but an abscess had formed and I was scared out, fortunately for the boy, for he recovered and is now forty-three years old. Nevertheless, my reputation spread as having done something great.

Another early case which I will not forget was when forced to do a hysterectomy after making the mistake of passing my instrument through a cancerous fundus uteri. Visions of peritonitis and rapid death associated with a malpractice suit scared me not a little. I had always known of the danger of doing just this but never thought it could be so easily done. Hastily summoning Doctors Parrott and Van Valkenburg from our town to assist me, we did an hysterectomy on the kitchen table which resulted in the patient's recovery. She lived about one year and eight months and enjoyed fair health for that length of time.

Another similar case in the early days was a Mrs. M., operated on in her home for cancer of the cervix involving the upper part of the vagina, in which a pan-hysterectomy was done, removing, also, the upper part of the vagina. The patient recovered, became apparently well, was able to do her own shopping, but finally died after two years.

Our gallbladder cases were simply drained, for this was the custom of the day and the more stones we removed the greater surgeons we were.

Over thirty years ago, before the telephone connected our town with surrounding villages, I received a telegram from an itinerant preacher and would-be doctor to "Come at once to Clarissa child born, no colon." Knowing the doctor by reputation I figured that instead of its being a colon it was a period that was missing and that it was an imperforate anus that we had to deal with. Expecting to have a little help I was rather surprised not to have the doctor show up, so, hastily placing the baby before a west window, for the sun was about to set, we gave but a few drops of chloroform and then turned that part over to a neighbor woman to give as directed. The baby was in extremis, greatly bloated, evidently in great misery and almost constantly vomiting. There was absolutely nothing external as a guide in making the incision except the vagina, but by keeping close to that and dissecting upwards for a half to three quarters of an inch I came to the bowel, which was fortunately distended like the rest of the canal. On incising the bowel there was a rush of fecal and gaseous discharge which was a wonderful relief and the baby was almost immediately at rest. I attempted to bring down the gut but gave that up. Dilators were used on this case for a period of two or three years, but there has never been any trouble since that time. She is still living, twenty-six years old, and has a family of five children. The points of interest in this case are: first, that a baby could live nine days with no passage of the bowels, and that the condition had not sooner been discovered; second, the fortunate distention of every part of the canal undoubtedly made it easier to find the bowel; third, although both internal and external sphincter muscles had undoubtedly been cut, possibly twice, she has perfect control of the bowels. Statistics show that imperforate anus occurs about once in 50,000 births, indicating the rarity of the condition.

A CASE OF OBSTRUCTED BOWEL OCCURRING IN THE PRACTICE OF DR. C. E. REEVES

In 1917, Dr. C. E. Reeves of Eagle Bend, Minn., was called in the country to see one Anton H., thirty-five years of age, who was suffering great abdominal pain. Unable at the time to diagnose the case, the man was given morphine hypodermically. The next day, toward night, the pain returning, he was brought to the doctors' hospital in Eagle Bend, where he passed the second night. I first saw the patient the next morning, about thirty-six hours after the beginning of the attack. We found the patient vomiting, in great distress, and presenting a hard tense tumor-like mass in the lower abdomen, extending as high as the umbilicus. There had been no bowel movement, although the usual enemas had been given. Temperature was normal, pulse 126, skin cold and clammy. He was placed on the table, etherized, and a median line incision made. Immediately there was an escape of distended black and gangrenous bowel which, when delivered, covered the whole abdomen. My first thought was to puncture the bowel, allow the gas to escape and then crowd the bowel back and sew him up, as it seemed like a hopeless task to

remove such a mass, but on second thought we realized that would indeed be a cowardly act and so concluded to go ahead and do what we could, regardless of results. There seemed to be bowel everywhere and it was with the greatest difficulty that we were able to get down to the obstruction. We found it impossible to see the obstruction, but there was seemingly a hard, firm band forming a loop that the bowel had passed through. It was only by considerable pressure that I was able to force my finger partly through the constriction sufficiently to release the bowel. To make matters worse, the bowel had perforated and some fecal discharge was present in the right iliac fossa. This area was cleaned out and packed away from the balance of the field. After finding healthy bowel, a side-to-side anastomosis was made, the mesentery was sewed over and over with back stitching on the line of demarcation and ten feet of bowel removed. The usual abdominal toilet was made with rubber drainage from the right iliac region, and the patient was returned to bed. In order to determine how much bowel had been removed and not having a tape line or measuring rule, I held the bowel up at its middle point by a pair of forceps so that the two open ends would be hanging down and even. By holding the forceps on a level with my collar button, the two open ends just reached the floor, a distance of over five feet. In our hurry to get through we had no time to investigate the nature of the constricting band, nor did we find out just what part of the small bowel had been taken out. He had a rather stormy convalescence at first, but, on the whole, satisfactory. Dr. Reeves attended him entirely and could give the details of his convalescence. I intended to report this case soon after recovery took place, for up to that time I had not noticed any report of more than eight feet of intestine having been removed with recovery. But I understand that the American Medical Association Journal, answering a question as to what is the largest amount of bowel ever excised with recovery, cited a case where twenty-one feet had been removed. Both Dr. Reeves and myself thought this man would die from lack of nourishment, even if he survived the operation, but I understand he is as physically fit as he ever was. I believe he was arrested not long ago by Sheriff Burns of our town for bootlegging, so we didn't do so very much after all. There were present at this operation, Mr. Landeen, the druggist at Eagle Bend, who gave the ether, Dr. Reeves and his wife and myself.

On August 2, 1922, O. A., forty years old, investigated the cause of a breakdown in the electrical system at Long Prairie, following a storm. While standing on the wet cement platform at the base of a transformer, he raised his right arm to point out the trouble and immediately there was a flash of electricity and 32,000 volts passed through his body to the ground. He was put into a truck by an assistant and brought to the hospital at once. The man was crazy from pain and had to be held. Two hypos of morphine were given with apparently no effect before he was put under ether. His right arm had evidently been sufficient to form an arc, for we found the arm burned through and through as far as the shoulder, while the crown of his head had received the balance of the discharge, matting his cap and hair down into a solid adherent mass. From these points the flash had evidently spread out, covering the neck and upper part of the chest. There were no burns on the lower trunk or on the legs, but both feet and ankles were badly and symmetrically burned. On the bottom of the heel of each foot there was a hole a half inch in diameter extending through the skin only, but completely burned out. The condition of the man was so distressing and the surface to be treated was so extensive that carron oil, being at hand, was applied on non-absorbent cotton instead of the paraffin that we usually use. Later, a well diluted antiseptic ointment was used. Immediately on coming out from under the effects of the ether the patient, much to our surprise, was rational, the brain, notwithstanding the terribly deep burn on the crown of the head, evidently not having been damaged. Later, we found the whole outer table of the skull over an area seven inches in diameter had been destroyed. The right arm was amputated at the shoulder joint on the third day. This area healed very satisfactorily, but the electrical burns were much slower in healing than if caused by hot water or fire. They are similar but less severe than the *x*-ray burns. The surrounding tissue looked healthy to the naked eye, but we found it devitalized and slow to come back to the normal. To hurry over this case, the arm healed completely in three weeks as did the burns on the face, neck and shoulders. It was two months before the feet were healed, as the burns were deep, and it was over a month before we could

separate the scalp from the burned bone underneath. The man went back to work in three months and has been working ever since. He was well and able to work except for the fact that he had been completely scalped, a circle seven inches in diameter with nothing but the burned skull remaining. In this condition his head was dressed daily with moist boric acid solutions for some time. In order to hasten the reparative process here, small eighth-inch holes a quarter inch apart were bored through the outer table of the skull, avoiding the longitudinal sinus, in the hope that new tissue with good circulation would fill the holes and thus help more quickly to separate the devitalized from the good bone. Considerable of the dead bone was removed later on with chisels, leaving a raw surface below. After all dead bone had been removed I made the proposal of skin grafting, but as that would necessitate his giving up his work of superintending the electric system along the Great Northern he would not hear to it and so this has been dressed daily, trying different applications, and we found that the progress was better under a mild antiseptic vaseline than under any other preparation. There still remains a small circle not healed, possibly one and a quarter inches in diameter, which is slowly closing in.

This case differs from all cases of avulsion of the scalp that I have seen reported in the literature, in that instead of good bone, we had charred and dead bone to deal with. Then it is interesting in that the brain apparently did not suffer after receiving such a heavy discharge of electricity on the top of his head. He was at all times rational after the first dressing. It is also interesting that with such a heavy electrical discharge no internal vital organ suffered and that the bones of the ankles and feet, which were horribly burned, were not injured. It is also interesting to know that the area denuded was closed or will be very soon without resorting to skin grafting. It was a long drawn-out case, lasting three years, but he was only away from his work three months.

When it is remembered that numbers of lives have been lost by simply standing on a wet pavement or in a bathtub and receiving the discharge from an incandescent light of 110 volts, it seems short of the miraculous (although I do not believe in miracles) that he should escape with life with 32,000 volts passing through him.

MERCUROCHROME IN ACUTE INFECTIONS ON THE CENTRAL NERVOUS SYSTEM*

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St. Paul

In reviewing the literature of the past year or two with special reference to the use of mercurochrome, one is impressed by the absence of testimony concerning its use in infections of the central nervous system. Its widespread surgical use with the brilliant results claimed for it would lead one to believe that it might also be useful in intra-cranial infections. However, this fact has apparently not impressed itself upon the profession at large, for very little can be found published upon this subject. Scattering articles here and there with reports of a case or two giving various results are the most that can be found. It is my purpose to set forth briefly the results of our own experiences along this line, citing two or three cases, and to give the conclusions which we have drawn therefrom.

In the first place, we have limited our use of mercurochrome to the usual dosage of five milligrams per kilogram of body weight, and have given it intravenously in a 1 per cent solution. We have not attempted to use it by injection into the subarachnoid space, either in the lumbar region or in the cisterna magna. Our technic has been the usual technic of any intravenous injection, giving it into one of the veins of the forearm, injecting it very slowly, taking approximately three minutes for the injection of ten or fifteen c.c. of the solution. We have never seen any untoward effects as a result of the injection other than the usual reaction which occurs in the use of this drug.

Considering first the intravenous use of mercurochrome in acute cases of epidemic encephalitis, we have not been able to see any satisfactory results. Following the reports of Young and Hill, with the eminently satisfactory results they obtained by its use in septicemia and the blood stream infections, we felt that it was worthy of a trial in encephalitis. The absence of a known causative organism as well as the absence of a positive blood stream infection in this disease made us a little skeptical as to its efficiency. Encephalitis is a localized process involving a greater or lesser portion of the brain, as

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the case may be, with a profound toxemia, producing greater or lesser effects upon the patient. Because a drug is an effective germicide and will definitely kill organisms when injected into the circulating blood, it does not necessarily follow that it will produce a curative effect upon some inflammatory process which is localized in some one organ of the body. Our results in its use in encephalitis have borne out this theory. We have used it repeatedly with absolutely no beneficial effect to the patients. They have had a chill with a rise in temperature, sometimes as high as 104° within an hour or two following the injection. This reaction has gradually subsided and there has been no apparent change in the condition of the patient. Secretions have shown that the drug is excreted through the kidneys and bowels, but we have not been able to demonstrate it in the saliva or in the spinal fluid. Bunten and Whitman reported salivation and Guy reported stomatitis following the intravenous use of mercurochrome, but we have not seen any toxic effects with a single exception of one or two instances of diarrhea, lasting for a few hours.

Contrary to our results, John W. Vischer reports two cases of epidemic encephalitis in which marked improvement was noted following the use of mercurochrome intravenously. He used a dosage less than that recommended by Young and Hill and less than that used by us. He feels as a result of his observation of these two cases that a more extensive trial of this method of treatment is warranted. His two cases are the only ones mentioned in the literature of the last year in which improvement occurred. Dr. Nels Werner of Eau Claire, Wisconsin, has informed me personally that he used this treatment in two cases of acute epidemic encephalitis with very definitely beneficial results. In commenting upon the difference in results obtained by these two colleagues and those obtained by ourselves, one or two possibilities are suggested. There is first the possibility that a true encephalitis did not exist. One can imagine an active infection in the blood stream giving a toxemia which would produce exactly the symptoms of epidemic encephalitis and which would yield immediately to the mercurochrome treatment as reported by Young and Hill. It is difficult to conceive of a true encephalitis with actual inflammatory involvement of the brain, making such startlingly rapid improvement following a single injection of any medication. On the other hand, granting that a true encephalitis did exist in these cases reported, it is possible that the causative organism belonged to a different strain than that of our series. The bacterial side of this subject is so vague and unsatisfactory that scientific explanation upon the difference in results obtained by different clinicians cannot be given.

Following our failure to get results in the treatment of encephalitis we determined if possible to try mercurochrome treatment in infectious meningitis, where we could determine the causative organism and study its effect by comparative spinal fluid studies. Accordingly, in May, 1925, we made use of it on a series of meningitis cases, occurring secondary to middle ear infection and I wish to report herewith three of those cases which will typify the results obtained.

Case 1. A schoolgirl, fourteen years of age, referred by Dr. Charles Connor of St. Paul, was admitted to the hospital April 16, 1925, with pain in the right ear and a temperature of 100° and pulse of 82. She was attended by Dr. Connor, who pronounced it an acute otitis media. On the 18th of April at 7 A. M. she had a chill with a rise of temperature to 104°, pulse of 120, with a good deal of pain in the head and back of the neck. We were asked to see her at this time and made a spinal puncture which showed a cloudy fluid; cell count 8,224 per c.m.n.; 63 per cent p.m.ns. and 37 per cent lymphocytes. The smear showed no bacteria and the culture gave no growth. Leucocyte count at this time was 25,200; 89 per cent p.m.ns. and 11 per cent lymphocytes. There was some improvement following the spinal drainage, which was repeated on the 19th and 20th. On the 21st she was given her first injection of mercurochrome, being given 20 c.c. of a 1 per cent solution intravenously. One hour and ten minutes after the injection she had a severe chill, lasting ten minutes, with a rise of temperature to 105°. In about two hours the temperature dropped to 100.8. A lumbar puncture performed at this time showed the spinal fluid to be unchanged. There was no coloration from the mercurochrome, though both urine and feces were definitely stained. On the 22nd, the mercurochrome was repeated in the same dosage and followed again by a lumbar puncture with the same results. The punctures were made following the injection to try and promote the passage of the mercurochrome solution from the blood stream into the cerebrospinal fluid, similarly to the procedure in the treatment of cerebro-spinal syphilis with salvarsan. On the 23rd of April, another injection of mercurochrome was given and was followed by a chill and rise of temperature, but the spinal fluid showed no stain. It was then thought best to give no more mercurochrome for a time as it did not seem to be benefiting the patient and we feared a toxic reaction. Accordingly, the usual spinal drainage was continued every twelve hours. The patient grew steadily worse and died at 2:30 P. M., April 26. Repeated cultures from the spinal fluid showed no growth, so it was not possible to isolate an organism in this case. There was no special reduction

in the cell count in the spinal fluid as a result of the mercurochrome treatment, and no special clinical improvement.

Case 2. A schoolgirl, eleven years of age, referred by Dr. M. W. Wheeler of St. Paul, was admitted to the hospital April 18, 1925, with a provisional diagnosis of staphylococcus meningitis, secondary to an acute left labyrinthitis. She had had a discharging left ear for two years, following scarlet fever, and had been operated on for a left mastoiditis about a year before admission to the hospital, without relief from the discharging ear. The spinal fluid examination the day of admission showed no bacteria but a cell count of 6,400, 30 per cent p.m.ns. and 70 per cent lymphocytes. The culture showed staphylococcus. On the 19th of April, she was given 20 c.c. of a 1 per cent solution of mercurochrome intravenously followed by drainage of the spine. About an hour after the injection she had a chill followed by a rise in temperature to 103.2. On April 20 she was given another injection of 20 c.c. of a 1 per cent solution of mercurochrome, followed by a spinal drainage. She had a chill lasting one-half hour with a rise in temperature to 104.2. Following this treatment there was very free bowel action and both urine and feces were stained red, but there was no staining of the spinal fluid. On April 21, another injection of the same dosage of mercurochrome was made, followed by spinal drainage, and again there was a chill lasting 30 minutes with a rise in temperature to 104°. Because of the apparent toxic diarrhea with intense staining of the stools, there was no more mercurochrome given until April 24, when a 20 c.c. injection of 1 per cent solution was given followed by a spinal drainage. At this time it appeared that this patient was improving under the treatment. She seemed brighter, more comfortable, more rational, and better in every way. However, in this respect she did not differ from other cases of septic meningitis in which repeated spinal drainage have been performed without the use of mercurochrome. Because of the fear of toxic results no more mercurochrome solution was given. The patient's condition remained about the same until April 28, when she became rapidly worse and died on the 29th. There was no apparent immediate effect in this case following the use of mercurochrome other than the chill and rise of temperature which followed the injection. The spinal fluid showed no changes as a result of treatment and the course of the case was not especially different from that of other cases, in which mercurochrome was not used.

Case 3. A schoolboy, thirteen years of age, referred by Dr. H. P. Ritchie of St. Paul, was admitted to the hospital April 19, 1925, with a temperature of 104° and entirely irrational, a very definite clinical case of septic meningitis following a middle ear infection of about ten days' duration. The spinal fluid examination showed a cloudy fluid with a cell count of 8,000; 60 per cent p.m.ns.; 40 per cent lymphocytes. The smear showed no bacteria, but a culture showed a pure growth of pneumococcus. An immediate injection of 25 c.c. of a 1 per cent mercurochrome solution was given intravenously. It was followed in about an hour by a slight chill, but no further rise in temperature and with no effect upon the patient. The next day this injection was repeated followed by spinal drainage, with positively no effect upon the patient. The urine and feces were stained but the spinal fluid showed no change. In view of the fact that the mercurochrome was producing no result, it was decided to discontinue it and anti-pneumococcic serum was given intravenously and intraspinally. This also produced no result. The patient died on April 21, not having responded to treatment in any way. In this instance mercurochrome was apparently useless.

Time and space do not permit the recital of any further cases, but the above are typical and illustrate both the use and effect of mercurochrome as we have found it to be. The question arose in our minds as to the value of a mercurochrome solution introduced directly into the cisterna magna, where its circulation in the sub-arachnoid space and through the ventricles of the brain would be assured. Ayer of Boston, in his splendid research in the field of spinal fluid, has demonstrated that circulation from the cisterna magna is much more free and diffuse than it is from the lumbar region. Therefore, we considered the injection of mercurochrome solution into the cisterna magna in these cases mentioned, but decided against it. Following the fatal outcome of all our cases we decided that at the next opportunity we would try it in the cisterna magna. That opportunity has not yet presented itself. Contemplating the writing of this paper we wrote a personal letter to Dr. Ayer requesting his opinion as to the efficiency of mercurochrome in acute infectious processes involving the central nervous system. He replied that he had tried it out and considered it of no value whatsoever and said that his results coincided exactly with our own. He stated furthermore that in one extreme case of septic meningitis he had injected into the cisterna magna a 1 per cent solution of mercurochrome. Death followed in twenty minutes from respiratory paralysis and Dr. Ayer said he felt that the drug probably played a part in producing this paralysis.

Following the brilliant reports of Young and Hill and the equally brilliant reports of some others, we hoped that we had found an efficient treatment for these terribly fatal brain and meningeal infections, but as a result of our own experiences, we are compelled to conclude that mercurochrome is of no value in the treatment of central nervous system infection. This opinion is concurred in by Dr. James B. Ayer of Boston, who is

an authority in American neurology. Notwithstanding our opinion, the reports of this treatment are so meager in the literature and it has apparently been used so little, that possibly there will yet be devised some means of using it with greater success.

BIBLIOGRAPHY

1. Visher, John W.: Northwest Medicine, June, 1924, 271.
2. Hopkins, F. S.: Boston Med. and Surg. Jour., Oct. 16, 1924, 732.
3. Visher, John W.: Jour. Am. Med. Assn., Aug. 2, 1924, 376.
4. Young, Hugh H., and Will, J. H.: Jour. Am. Med. Assn., March 1, 1924, 669.

"Since the first week in January he has supplied these stations with a weekly statement corresponding to barometric readings of the weather bureau, showing the number and location of all reported cases of contagious diseases in the cities concerned. With this information the local health officer can determine the probable danger to his community and take steps to ward off epidemics. 'Epidemics are no longer the mysterious outbursts of the past,' said Dr. Rawlings. 'On the contrary, the prevalence of the common contagions can be predicted with an accuracy that approaches weather forecasting. Just as tornadoes and cyclones are atmospheric disturbances peculiar to the warmer months, so epidemics of various diseases have a seasonable predilection, appearing with the greatest frequency during the colder months. As the path of a storm is indicated by fluctuations of the barometer, so the course of an epidemic is determined by the location of unquarantined cases and the number and activities of susceptibles. For these reasons the Illinois State Department of Public Health has determined to supply local health officers in the forty-four largest cities of the State with a weekly communication showing the reported prevalence of communicable diseases. On the basis of these reports the health officers can take precautionary measures against the introduction of contagion into the communities which they serve.'"—Isaac D. Rawlings, *Hygeia*.

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VOLVULUS OF THE SMALL INTESTINE*

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Minneapolis

Volvulus, as defined by Van Hook and Kanavel,[5] is a rotation or twisting of a loop of bowel upon its mesenteric axis with resulting obstruction of the fecal current and blood supply. Rokitanasky,[5] according to the same authors, states that the entire mesentery, or a section of it, may rotate from one-half to several times upon its axis. Briggs[3] found that 15 per cent of acute obstructions were due to volvulus. The twisting may be partial, complete, or in two or three turns. Bickham[1] defines two types, namely, simple volvulus, where the loop of bowel is twisted on its mesenteric axis, and compound volvulus, where two loops are twisted about each other.

The ileum, because of its length and because it occupies the hypogastric, the right iliac, the umbilical and the pelvic regions in the abdomen, seems to be the portion of the small intestine more predisposed to volvulus.

Cicatricial contraction of the mesentery due to peritonitis or mesenteritis, organic stricture of the bowel, unusual length of bowel, bands of adhesions, chronic constipation, kinks, attachment of the intestine to inflamed organs, strangulations through openings, and large gallstones attempting to pass through the small intestines, are some of the etiological factors in volvulus. The experiments of Senn,[4] who rotated loops of bowel in animals and sutured them into position, showed the normal bowel with a normal mesentery was able to break its sutures and adhesions and right itself in time to prevent obstruction, but the intestine of unusual length, with a long or very narrow mesentery, became paralyzed, thus preventing its release and causing obstruction.

Rokitanasky[5] found volvulus occurring more frequently in men than in women. Very tall individuals with correspondingly long intestines are especially predisposed. Russian investigators[6] found that volvulus of the small intestine was the most frequent form encountered, due doubtless to the tall stature of the average Russian.

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Bickham[1] discovered that volvulus of the small intestine in infants was usually due to narrowing of the mesentery.

The onset is usually sudden, accompanied by pain, vomiting and the absence of bowel movement. The fecal odor of the material vomited becomes more typical as the condition advances. The pulse, temperature and respiration may be unaffected at the beginning of this condition and may remain so until it is well established. The leukocyte count is not always of great value, as it may be high or it may be low.

An examination of the patient usually reveals a tense abdomen with loops of the distended bowel many times forming a palpable mass and visible peristalsis.

The diagnosis, as in all forms of intestinal obstruction, hinges on the absence of bowel movement and on the inability of enemas to produce results, as well as the typical odor of the vomitus. History of previous attacks of abdominal diseases, operations for their relief and chronic constipation are all of diagnostic value.

Once the diagnosis is established, the treatment is always surgical.

In operating, either a long rectus or a subumbilical incision may be used, depending somewhat upon the location of the trouble. The operation consists of locating and severing adhesive bands, untwisting the volvulus and an examination of the distended and collapsed portions of the intestine. Unless the situation appears quite favorable, it is well to drain a portion of the distended bowel by means of a rubber tube, fastening the bowel and tube to the peritoneal opening. Plicating the mesentery and stitching it to the parietal peritoneum are methods often employed to prevent the recurrence of volvulus. Resection of a gangrenous portion of the intestine and mesentery may also be imperative, but the majority of these patients are not in condition to undergo prolonged surgical procedures and the simple drainage with its resulting fistula is no doubt the means of saving life in many cases.

The prognosis depends upon the length of time since the obstruction took place, the resistance of the patient, duration of operation, and whether or not drainage is established in extremely distended cases.

In a series of twenty-nine cases at St. Thomas Hospital, London, quoted by Burghard and Kanavel,[2] there was a mortality of 65 per cent. The mortality in the hands of others varies from 50 to 65 per cent usually.

The accompanying illustrations of the five cases operated upon are somewhat schematically drawn from the operative findings of the surgical charts with the exception of Figure 5, which was demonstrated upon the cadaver for the artist.

The five cases here reported were all due to the ileum becoming adherent to some other structure. Three of the abdomens had been opened previously.

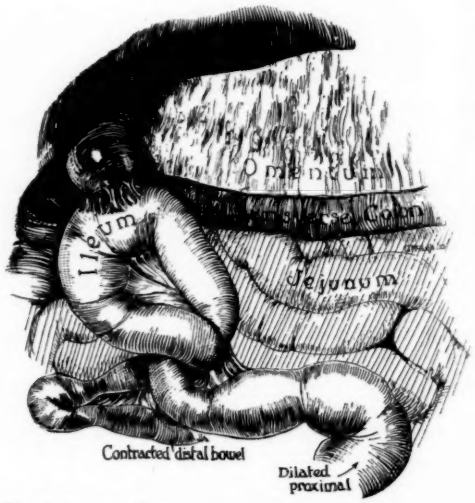

FIG.1- ILEUM ADHERENT TO GALL-BLADDER.

CASE 1. (Fig. 1)—Mrs. J. K., age 49, female, housewife, Jewish.

Date First Seen: August, 21, 1922.

Chief Complaint: Pain in upper abdomen, especially in gallbladder region and sharp griping pains in bowels. Unable to get bowels to move even with the aid of an enema. Patient had been vomiting greenish material for the past twenty-four hours.

Family History: Negative.

Past History: Health good until this illness except for a gastric disturbance evidently due to biliary tract disease.

Present Illness: For the past several days, patient had pain in right abdominal quadrant, slowly increasing in severity. No bowel movement for the past twenty-four hours and had been vomiting.

Physical Findings: The abdomen was distended and tender, especially in the gallbladder region. Rather an indefinite mass was palpable over the upper right abdominal quadrant. Temperature 100, pulse 80, respiration 20.

Laboratory Data: The urine was negative and the leukocyte count 13,300.

Course in Hospital Previous to Operation: The patient was given enemas with no results. The vomiting continued in large quantities with a typical odor and appearance.

Diagnosis: Cholecystitis with obstruction of the bowel.

Operation: Following the usual preparation, under local anesthesia, the abdomen was opened by means of a long right rectus incision.

Findings: Distended loops of ileum presented at incision. A loop of ileum was attached to the gangrenous fundus of the gallbladder and was twisted twice upon its mesenteric axis (Fig. 1). The gallbladder was greatly enlarged and filled with large and small stones. The operation was continued under gas oxygen and ether anesthesia.

Work Done: Detachment of ileum and gallbladder, untwisting of volvulus, opening of gallbladder through the gangrenous portion of the fundus, removal of the stones and drainage of gallbladder.

Course in Hospital Subsequently: There was considerable distention and some pain the first three days. The gallbladder drained well and there was no further intestinal trouble. Gas passed from the bowels in the usual manner.

Results: The patient left the hospital on September 12, 1922. The gallbladder drained for a reasonable length of time. A post-operative hernia developed, which was repaired by me on July 26, 1924.

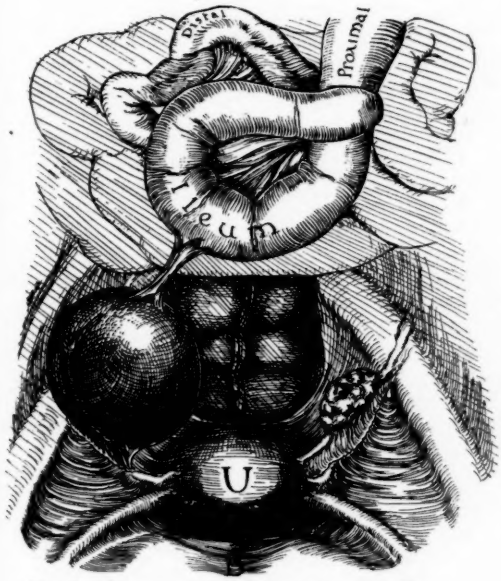

FIG. 2 - ILEUM ADHERENT TO OVARIAN CYST

CASE 2. (Fig. 2)—Mrs. Anna O., age 35, housewife, white, American.

Date First Seen: September 6, 1922.

Chief Complaint: Patient was suddenly seized with severe pain in the abdomen the day before, which confined itself to the epigastrium. The taking of foods or liquids produced vomiting. No bowel movement since the beginning of the attack.

Family History: Both tubes and the appendix had been removed in September, 1920. Since then she had been well until six months previous to this attack, at which time she became constipated, finding it necessary to use cathartics to obtain a bowel movement. Patient had also been belching considerable gas during the past six months.

Present Illness: Seized with pains on September 5, which persisted. Vomited on taking food and liquids; no bowel movement even with the aid of enemas and no gas passed from bowel.

Physical Findings: Patient fairly well developed, expression anxious, very restless, abdomen rigid and generally tender to the touch, especially over the lower right quadrant. There was a papable mass in this region.

Laboratory Data: The urine showed a faint trace of albumen, but was otherwise normal. Her hemoglobin was 83 per cent, red cells 4,800,000 and white cells 3,200.

Course in Hospital Previous to the Operation: She had continuous pain and vomited greenish foul-smelling fluid in large quantities.

Diagnosis: Obstruction of the bowels.

Operation: Following the usual preparation, the abdomen was opened by means of a long right rectus incision.

Findings: Considerable free fluid in the lower abdomen. A loop of the ileum near the ileocecal valve was attached to an ovarian cyst of the right side and twisted twice upon its mesenteric axis (Fig. 2). The left ovary was found to be cystic, also.

Work Done: The loop of ileum was detached: the volvulus untwisted and both ovarian cysts removed.

Course in Hospital: Recovery uneventful.

Pathological Report: Right and left ovaries showed cystic degeneration.

FIG. 3 - ILEUM ADHERENT TO SAC OF HERNIA

CASE 3. (Fig. 3) — George M., male, age 53, janitor, white, Dutch.

Date First Seen: August 10, 3 P. M.

Chief Complaint: Inability to get bowels to move even with the aid of salts and castor oil taken that morning. Paroxysms of severe pain in abdomen. (Advised of grav-

ity of condition and ordered to hospital but refused to go.)

Family History: Negative.

Past History: Patient had a right inguinal hernia of many years standing, and was chronically constipated.

Present Illness: Unable to get bowels to move for past two days. Severe cramps in abdomen. Salts and castor oil taken that morning only served to increase the abdominal pains. (Seen again that evening.) No enema had been given as instructed and patient had vomited considerable throughout the afternoon. (He then agreed to go to the hospital.)

Physical Findings: Patient very tall and muscular, with no excess of weight. Palpation of abdomen revealed nothing, but percussion elicited a very flat tone in lower abdomen to the right of the median line. (The abdomen became very tense during the examination. Patient drew his knees up to his chest to relieve pain.) Right inguinal hernia. Tenderness very marked at external ring.

Laboratory Data: Emergency case—no blood or urine examinations made.

Course in Hospital Previous to Operation: Patient was given an enema with no results. Vomited very large amounts of typical fecal matter. Temperature 98, pulse 78, respiration 20. Evidently in condition of shock due to prolonged suffering.

Diagnosis: Complete obstruction of bowel.

Operation: Following the usual preparation, the abdomen was opened by means of a long right rectus incision.

Findings: Greatly distended coils of the small intestine bulged out through the opening and a loop of the ileum was found to be attached to the pulled-out sac of a right inguinal hernia. This loop of ileum was twisted two and a half times upon its mesenteric axis (Fig. 3).

Work Done: The adhesion was quickly severed and the volvulus untwisted.

Course in Hospital Subsequently: Patient died an hour later.

CASE 4. (Fig. 4)—Miss Lena A., age 27, female, milliner, Swedish.

Date First Seen: January 24, 1924.

Chief Complaint: For the past twenty-four hours patient had had pain in abdomen, absolute constipation and vomiting.

Past History: Hemorrhoidectomy three and a half years previous. Appendectomy, double salpingectomy and suspension of the uterus, a year previous to this attack, for the relief of appendicitis, salpingitis and retroflexion of the uterus—latter fixed and immovable by adhesions. Patient had always been constipated, having gone three and four days at a time without a bowel movement. This condition was relieved after the second operation, but the patient gradually became careless in her habits again with resulting habitual constipation.

Present Illness: Since January 23, patient had been suffering with pain in her abdomen and absolute constipation.

Physical Findings: Patient undersized and a very slender individual. Expression anxious, abdomen distended, tender and tympanitic. Knees drawn up to relieve pain. Temperature 98, pulse 100, weak, irregular and hard to count.

Laboratory Data: Urine normal. Hemoglobin 73 per cent, red cells 4,900,000, white cells 7,200.

Course in Hospital Previous to Operation: Patient continued to have pain, vomiting and absolute constipation. Molasses enema produced a liquid stool, but the vomiting

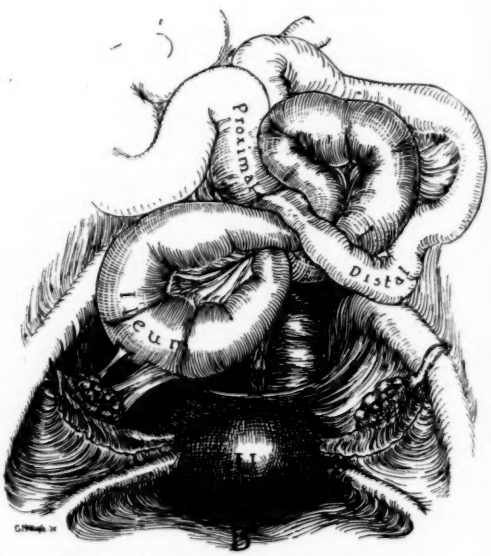

FIG. 4 – ILEUM ADHERENT TO OVARY

continued and was of a distinctly fecal odor and in large amounts. Repeated stomach lavages brought away very large amounts of greenish brown fluid with a fecal odor. Intravenous saline given. Later enemas unproductive.

Diagnosis: Obstruction of the bowel. Patient taken to the operating room early in the evening of January 25, 1924.

Operation: Following the usual preparation, the abdomen was opened by means of a long right rectus incision.

Findings: A loop of the ileum was attached to the right ovary and twisted twice upon its mesenteric axis (Fig. 4).

Work Done: The adhesions were separated, the volvulus untwisted and the small intestine drained by means of a long rubber tube through the peritoneal opening.

Course in Hospital Subsequently: Her recovery was uneventful. The fistula followed the usual course in closing, narrowing itself down eventually to a very small opening, and was closed operatively February 4, 1925.

CASE 5. (Fig. 5)—Miss Elsie R., aged 30, housemaid, white, American.

Date First Seen: August 3, 1925.

Chief Complaint: Inability to get bowels to move, pain and vomiting.

Family History: Negative.

Past History: Operated upon November 20, 1922—double salpingectomy and appendectomy. Her recovery was uneventful and subsequent health fairly good up until about six months ago, since which time she had been constipated.

Present Illness: On Monday, August 3, a slight diarrhea appeared, following the eating of meat. The patient had a bowel movement from an enema given Monday, but no results from the one given Tuesday and vomited some greenish material with an odor suspicious of feces. She was seen again Wednesday evening for the second time and sent to the hospital.

Physical Findings: Patient very tall, slender woman, with a poorly developed chest and considerably underweight. An examination revealed rigidity of the abdominal muscles of both sides and on palpation marked tenderness over most of the abdomen. A palpable mass was present to the right of the median line, extending downward into the pelvis. During the examination, reverse peristaltic waves were visible on the abdomen attended by paroxysms of severe pain, followed by vomiting of large amounts of greenish brown fluid with a distinct fecal odor. Her temperature was 99, pulse 100, and respiration 25.

Laboratory Data: Leukocyte count 18,000. Urine negative.

Course in Hospital Previous to Operation: Patient continued to have severe pain, copious vomiting and no bowel movement whatever.

FIG. 5 - ILEUM ADHERENT TO UTERUS AND ADNEXAL AREA WITH TORSION OF MESENTERY

Diagnosis: Obstruction of the bowel.

Operation: Following the usual preparation, the patient was operated upon Wednesday night, August 5. The abdomen was opened by means of a long right rectus incision.

Findings: Greatly distended loops of small bowel bulged out through the opening; loops of ileum adherent by dense bands across the fundus of the uterus and site of removed fallopian tubes; entire mesentery proper was twisted upon itself in half turn; omentum adherent to ileum and anterior peritoneal surface; considerable free fluid in cavity (Fig. 5).

Work Done: Adhesions severed by sharp dissection; untwisting of mesentery; catheter placed in ileum and drainage established through peritoneal opening.

Course in Hospital Subsequently: Recovery uneventful. Fistula not closed as yet.

SUMMARY

1. Volvulus of the small intestine is a very frequent cause of obstruction.

2. The ileum is the portion of the small intestine most frequently involved.

3. Very tall, slender individuals and those who have been subjected to abdominal surgery are predisposed to volvulus.

4. Peritonealization of the operated areas, where it can be done successfully, no doubt lessens the frequency of volvulus.

5. The diagnosis is based practically upon the same symptoms as other forms of obstruction.

6. An enterostomy is a very important part of the surgical procedure, especially in extreme cases.

7. A fistula resulting from an enterostomy in the small intestine does not always require a resection for its closure. Merely dissecting out the sinus, tying it off close to the intestine and a purse string suture, will sometimess uffice.

BIBLIOGRAPHY

1. Bickham, W. S.: Operative Surgery, Philadelphia and London, Saunders, 1924, 4, 777.
2. Burghard, F. L., and Kanavel; Allen B.: Oxford Surgery, N. Y. Oxford University Press, 1919, 2, 820 to 822.
3. Da Costa, John C.: Modern Surgery, Philadelphia and London, Saunders, 965.
4. Senn, Nicholas: Surgical Clinics, Chicago, Meyer and Moncreiff, Philadelphia and London, Saunders, 1919, 3, 681-688.
5. W. Van Hook and Allan B. Kanavel: Keen's Surgery, Philadelphia and London, Saunders, 1908, 4, 666 to 667.
6. Scesk, Casop Lek: Internat. Med. and Surg. Survey, 61 and 62 Prague, Jan. 28, 1922.

SURGICAL TREATMENT IN DUODENAL ULCER*

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In the study of patients with duodenal ulcer two main groupings will become apparent: (1) those whose symptoms are of short duration and who appeal for aid early; (2) those whose histories give a prolonged succession of exacerbations and remissions.

Further observation reveals the information that the majority of medical controls and cures are found to be in the first group, namely, those whose symptoms are of but relatively short duration. This explanation is further strengthened if the etiology of duodenal ulcer is accepted as being of bacterial origin. Medical management of these early cases and with it a detection and removal of various foci of infection can be expected to accomplish a cure. However, in those patients whose histories show recurrences of digestive troubles extending over years, other factors are usually present, chief among which are concomitant lesions. In the cases with recent histories these infective foci, not necessarily further gross intra-abdominal conditions, may be eradicated. In this sense a chronic recurring duodenal ulcer can be viewed as a systemic disease with local manifestations, for coupled with the ulcer symptoms are often those of co-existing abdominal pathology. An instance of this is the marked frequency in ulcer patients of previous operations for appendiceal disease, many being of the suppurative type. On close questioning their histories will usually disclose that there was but temporary relief, if any, with an eventful rearrangement of symptoms gradually assuming those of the ulcer complex. In these cases in which chronicity is the outstanding feature more permanent tissue damage has occurred with resultant formation of additional foci of infection so that these people present a broader and less definite medical approach with correspondingly less favorable prognosis.

Obviously, the patients classed as surgical will consist of those who, after fair time and trial, have found medical management wanting.

On further investigation those patients referred to as surgical will be found to lend themselves to further grouping both as to signs and symptoms as:

1. Those suffering from obstruction to the food current, due to stenosis, cicatrices, etc.
2. Those with repeated or gross hemorrhage.
3. Those with associated or co-existing pathology.
4. Those in whom medical control has been incomplete for various reasons.
5. Those with or attempting perforation.
6. Those in whom a question of malignancy enters into consideration.

The surgery necessary to overcome these conditions may not only be called upon to treat the ulcer itself, but to maintain or reestablish passage of the food current and in addition the proper disposition of other presenting lesions.

While duodenal ulcer has been recognized as a clinical entity since 1817 when Travers[1] reported three cases of perforation it was not until 1896 that Dunn[2] successfully treated duodenal ulcer by surgery. From then on great impetus was given the diagnostic as well as surgical treatment by Weir.[3] To Moynihan,[4] especially, goes the credit for arousing interest as to the frequency of duodenal ulcer. The diagnosis, treatment (medical and surgical) of duodenal ulcer, therefore, is of recent years, barely three decades.

As to the diagnosis, the ability to ascertain the presence or absence of the ulcer has been greatly augmented in recent years by various clinical tests, chief among which, excluding the history, is the roentgen study. This has resulted in definite localization of the lesion, thereby clarifying the condition previously labelled peptic ulcer, separating gastric and duodenal ulcers according to their respective locations.

Of all operative procedures advocated for the relief of duodenal ulcer, gastroenterostomy or gastrojejunostomy has received the greatest acceptance and has accordingly received the greatest praise as well as condemnation and both deservedly.

Following the original surgical studies in gastric and duodenal surgery during the late eighties and nineties by such men as Pean, Rydgier, Billroth, Wolffer, Van Hacker and others, a new era in upper abdominal surgery was ushered in. The surgical world at large was quick to avail itself of anything tending to offer relief to sufferers of upper abdominal disease, with the result that gastric and duodenal surgery, which was at first vaunted as a panacea, was instead soon found not only inadequate but dangerous, especially as gastrojejunostomy was all too often the sole method of attack irrespective of the type or location of the lesion.

*Read before the Hennepin County Medical Society, Minneapolis, Nov. 4, 1925.

As a consequence of this setback the operative results varied according to the accuracy of diagnosis and to each individual's surgical ability.

Upon closer study and analysis of the surgical successes and failures it was found that while there were great contrasts as to after-results, certain definite preoperative deductions could be reached depending upon the data obtained in an individual case and that among the predominating factors to be dealt with were:

1. Presence of a lesion. It is unnecessary to add that the best of surgery in the absence of an ulcer can but court disaster and yet this was one of the great stumbling-blocks especially before the universal acceptance of a definite history further substantiated by clinical and *x*-ray findings as the only leads to the diagnosis of duodenal ulcer.

2. That the surgical management of gastric ulcer was not identical with that of ulcers of the duodenum.

3. That recognition and proper disposition must be made of associated lesions.

4. That the ulcers of the duodenum also varied as to their predominating signs and symptoms and that these in themselves demanded recognition and proper care. This is especially true of ulcers with histories of repeated hemorrhage.

It is not surprising that surgery has been questioned, for, in spite of the preoperative diagnosis being confirmed at operation, there were still obstacles in many instances preventing a cure, namely: (1) continued activation of the ulcer; (2) co-existing and untreated lesions; (3) stomal ulcer (gastrojejunal ulcer); (4) faulty technic.

The problem of continued activation of the ulcer following operation but further emphasizes the necessity of recognition of coexisting pathologic processes. This factor of continued activation of the ulcer has to a large degree been overcome by the destruction of the ulcer bed itself, when possible, at the time of operation either by cautery or excision. The formation of gastrojejunal or stomal ulcer occurs as a complication approximately in 2 per cent of cases and is but further evidence of some causative agent, a form of infection, still undetected.

Much has been said and written relative to the technic of all gastrojejunal shuntings and anastamoses. Probably the one greatest factor of benefit was introduced in Czerny's clinic by Peterson[5] in 1901 when he abolished the long proximal loop and in addition advocated that, in making the union of the jejunum to the posterior gastric wall, the long axis of the stoma be parallel with the long axis of the stomach and at nearly right angles to the greater curvature.

The stand taken that gastroenterostomy is nonphysiologic is to a degree correct yet sufficient numbers of previous sufferers so treated bear undeniable proof of its efficacy. The attempt to routinely replace gastrojejunostomy by various plastic procedures on pylorus and duodenum has not been wholly successful, the objection to these plastic operations for relief of duodenal ulcer being that they are limited in their scope of application. That is, the more pronounced the lesion often the less chance of doing a plastic operation because of tumefaction or inflammation of tissues, location, size of lesion, and adjacent disease. In other words, when most needed, these plastic procedures often cannot, or at least with great difficulty and increased hazard, be applied. Again the postoperative healing of these pyloroduodenoplasties is not wholly without mishap for, though closed transversely to the long axis of the lumen, contraction scars with resulting obstruction are possible.

To counteract this phenomenon of constriction, Strauss[6] maintains that the sphincteric portion of the ring is also involved in this complication. He has therefore advocated the partial resection of the sphincteric body. Also there is a possibility of the suture line adhering to the abdominal wall, liver or colon, and thereby interfering with motility and mobility.

However, in spite of the disadvantages mentioned pyloroduodenoplasties have their field of usefulness, especially among the early type of patients in whom chronic long-standing changes have not as yet occurred.

As patients with duodenal ulcer are seen and recognized earlier the utility of pyloroduodenoplasties may become enhanced. At least they commend themselves from the anatomic and physiologic viewpoints.

Observations on patients with duodenal ulcer who have tried systematic competent medical management and who have not received the desired results and who have subsequently submitted to operative intervention should after all be the determining factors as to the merits of any procedure. Within the past several years numerous continental surgeons have advised and are doing more extensive procedures in duodenal ulcer, advocating various resections, their reasons being that the ulcer-bearing area which may have a predisposing tendency for reformation of ulcer is, by resection,

removed. While these more drastic methods are apparently gaining ground and with good statistical proof, yet insufficient clinical observation has elapsed to warrant the discontinuance of so valuable an aid as gastrojejunostomy.

There are numerous statistical studies showing proof of the contention that in properly selected cases of duodenal ulcer gastrojejunostomy preferably with destruction of the ulcer area offers all that can be expected of any surgical procedure.

Sir Berkely Moynihan[7] has stated before his clinic at the Leeds Infirmary that over 90 per cent of duodenal ulcer cases treated by gastrojejunostomy consider themselves perfectly well.

The mortality from the immediate effects of surgery plus later complications as jejuneal ulcer, etc., is approximately 3 per cent, which is considerably below the rate for those so afflicted but under medical supervision in whom Deaver[8] states there is a potential mortality of from 15 to 20 per cent from acute complications such as hemorrhage and perforation.

That sufferers of duodenal ulcer in whom gastrojejunostomy is indicated can look forward to a postoperative life expectancy up to that of the average person for corresponding sex and age is shown by a report from the Actuarial Society of America.[9]

In a patient with duodenal ulcer in whom medical management has failed, the surgical procedure necessary to shortcircuit his food current and to eradicate the ulcer bearing area, if advisable, is but a step further in his care. In view of our present knowledge of infection no patient should be allowed to go on his way simply because a new food channel has been constructed, but an intensive co-operative investigation should be instituted to determine and eradicate the underlying causes.

To quote Moynihan,[10] "The operation of gastrojejunostomy has been greatly discredited in consequence of its performance in grossly unsuited conditions. Its very success has been against it."

BIBLIOGRAPHY

1. Travers: Bass History of Medicine.
2. Dunn: Tr. Clin. Soc., London, 1894, 28, 204-212.
3. Weir: Med. News, New York, 1896, 419.
4. Moynihan: Brit. Med. Jour., 1903.
5. Peterson: Verhandl. d. deutsch, Gesellsch. f. Chir., Berlin, 1900, 29, Part 2, 620 to 640.
6. Strauss: Jour. Am. Med. Assn., 82, 1765-1770.
7. Moynihan: Lectures, 1923.
8. Deaver: Surgery of the Upper Abdomen, 8th edition.
9. Balfour: Quoted Jour. Am. Med. Assn., Aug. 6, 1924, 83, 603.
10. Moynihan: Lancet, 1923, 631.

THE DIAGNOSIS AND MEDICAL MANAGEMENT OF DUODENAL ULCER*

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Epigastric or abdominal distress, "indigestion" or "stomach trouble," as the patient calls it, may be due to such a great variety of intra- and extra-abdominal disorders that before one can make a diagnosis of duodenal ulcer the first essential is a careful history.

In analyzing 1,000 consecutive cases of indigestion, Willson[1] found that duodenal ulcer occurred in only 115 cases. The number of diagnoses in the 1,000 cases complaining of indigestion was ninety-eight. In fact, almost any disorder that human flesh is heir to may cause abdominal or epigastric distress or pain. Most of the other ninety-seven causes of indigestion could be eliminated by a careful history.

Although history taking may seem trivial and easy, often much time and patience are necessary to bring out the essential facts.

It is important to inquire into the family history especially in regard to mental instability, tuberculosis and lues. Personal history should begin with childhood. Repeated attacks of tonsillitis or rheumatism may have preceded stomach trouble due to heart disease. Or a history of jaundice may explain the present symptoms arising from the gall-bladder. Often the patient has had indigestion for many years.

The gastrointestinal history should be complete. The chief complaint, its duration, onset and course should be noted. It is usually best to let the patient tell his story. This must be supplemented by questions in regard to appetite, deglutition, pain, belching, regurgitation, quality or quantity food dyspepsia, nausea, vomiting, weight loss, jaundice, night attacks, nature of stools, dyspnea, edema and urinary symptoms.

In regard to pain, inquiry should be made first as to its character. Is it a distress, a burning, grinding and gnawing sensation? Is it dull or sharp and agonizing? The time of its appearance, radiation, relation to food and mode of relief, if any, should be ascertained. If the pain occurs in attacks

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one must eliminate angina pectoris, renal colic and gallstone colic.

If there is vomiting the nature of the vomitus as to digestion of food and the presence of blood should be noted. Presence of food eaten some time before indicates retention.

Commonly one hears duodenal ulcer discussed as peptic ulcer, no attempt being made to differentiate between gastric or duodenal ulcer. As a matter of fact, it is very important to be specific because of the difference in symptomatology, prognosis and treatment. Duodenal ulcer is much more common than gastric ulcer. In the 1,000 cases complaining of abdominal symptoms above mentioned gastric ulcer occurred twenty-one times, while duodenal ulcer occurred 115 times.

Both types of ulcer may be acute or chronic. The duration of symptoms may be from a few months to ten or twenty years.

The patient with duodenal ulcer complains of epigastric distress, burning or gnawing in character, coming on in spells usually in the spring and fall of the year, lasting from a few weeks to a few months and with alternating periods of remission and exacerbation. At first the spells are infrequent and of short duration. Later they are more frequent, longer in duration and less easily controlled by the patient. The pain or distress is relieved by food and alkalies. It recurs from one-half to three hours after eating, depending to some extent on the quantity and quality of the food eaten.

The order of events is food, relief, pain; food, etc. Unless there is a variation in the amount of food taken at a meal the pain occurs at the same hours each day. Night distress, occurring usually at midnight, is common. The patient soon learns to relieve this by taking a glass of milk or some soda. As the ulcer becomes chronic the pain becomes more continuous.

If the ulcer is on the posterior wall of the duodenum or has perforated to the head of the pancreas there may be radiation to the back.

Vomiting is rare unless marked obstruction is present. Hematemesis and malena may occur. According to Horgan,[2] it occurs in 20 per cent of the cases of duodenal ulcer. In our experience it does not occur that often.

Patients with duodenal ulcer are nearly always well nourished and active. They have a good appetite and all they seek relief from, prior to obstruction, is indigestion and pain. As the ulcer becomes chronic or if there is marked obstruction weight loss is more in evidence.

Physical examination reveals no distinguishing evidence of duodenal ulcer. There is usually some tenderness in the mid-epigastrium slightly to the right. The chief value in physical examination lies in the exclusion of other conditions. Cardiovascular disease or even pulmonary tuberculosis may cause epigastric pain. The symptoms of cholecystitis may simulate duodenal ulcer. If one finds definite right costal margin tenderness or perhaps a palpable gallbladder a diagnosis of cholecystitis is evident. The abdomen should be carefully examined by inspection, palpation and percussion. Rectal examination should be a routine procedure.

Fractional gastric analysis may show the presence of hyperacidity, but often the curve is entirely normal.

Examination of the feces after three days of hemoglobin-free diet may or may not show occult blood. Absence of blood does not exclude ulcer.

Roentgenologic examination is very important. A duodenal cap which presents evidence of deformity or irregularity, associated usually with tenderness, in conjunction with a satisfactory history of duodenal ulcer is most significant. It should not be overlooked, however, that an ulcer may be present in the absence of positive *x*-ray findings.

The history in gastric ulcer is usually different. The patient is older and often undernourished or even cachectic and anemic. Food relief is not always definite and the patient often vomits to obtain relief. The pain always subsides before the next meal, while in duodenal ulcer it persists until food is taken. Periodicity is absent or less marked than in duodenal ulcer. There is less desire for food and often the patient is afraid to eat.

The location of the pain is epigastric, but often to the left of the mid-line, and point tenderness is common. Hemorrhage, when it does occur, is more severe than in duodenal ulcer.

Roentgenologically, gastric ulcer is demonstrated more easily than duodenal ulcer. A so-called niche or crater is found usually on the lesser curvatures. Often there is an incisura on the greater curvature due to spasm of the circular muscles.

The prognosis in gastric ulcer is not as good as in duodenal. The possibility of malignancy is

very great. Cancerous changes have been found[3] in 71 per cent. Any ulcer exceeding 25 mm. in diameter may be expected to be malignant. Malignancy rarely occurs on the duodenal side of the pyloric sphincter while cancer cells can frequently be found in the margins of an excised gastric ulcer.

In treating duodenal ulcer it is customary with us to place all patients on ambulatory dietary management except in cases of marked obstruction, or recent or repeated hemorrhages. If the obstruction is slight, frequent feedings and alkalies may bring relief. When more severe, rest in bed and peristaltic paralyzants together with dietary management are instituted. It is obvious that patients with recent hemorrhage should be put to bed. All are asked to be as quiet as possible during the first few weeks.

Our experience has been that most cases of non-obstructive duodenal ulcer obtain relief of symptoms, usually within twenty-four hours, on a two-hour management. Four to six ounces of milk and cream are given every two hours from 7 A. M. to 9 P. M. Midway between feedings 2 grams of an alkaline powder containing enough magnesium oxide to insure a daily evacuation of the bowel is given.

Beginning with the second or third day the patient is allowed, at four-hour intervals, in addition to the milk and cream, one ordinary cupful of a prescribed list of foods. The usual list from which he may select as he desires includes farina, cream of wheat, custard, tapioca, cornstarch or bread pudding, cream soups, soft eggs, etc. This list is gradually added to until it includes mashed vegetables, cooked fruits and finally beef, lamb, fish and chicken. The quantity is also gradually increased. The patient is weighed at each visit to the office.

All food should be mechanically non-irritating, it should not increase the hydrochloric acid content of the gastric juice, it should be small in volume and yet have sufficient caloric value to maintain weight.

During the first week there is usually a slight loss in weight, but after that the patient either holds his own or gains.

During the first three weeks the patient should report at least twice a week.

If the patient is symptom-free after seven or eight weeks of frequent feedings he is placed on a three-meal selected diet with a light lunch between meals. The milk and cream is continued at meals and between meals. Alkali is given one hour after the larger meals. He follows this plan for at least a year or two. As a matter of fact he should remain under observation indefinitely and his diet may have to be restricted as long as he lives.

Naturally, it is important to remove any and all possible foci of infection whether these be in the teeth, sinuses, tonsils, prostate, cervix, gallbladder or appendix.

Patients who do not respond to careful dietary management should be treated surgically. Obviously, surgical intervention is indicated in obstruction or when repeated hemorrhages have occurred.

On account of the frequent occurrence of malignancy in gastric ulcer I believe that this condition should be treated surgically unless the ulcer is small, non-penetrating and acute.

To summarize: The essentials in arriving at a diagnosis of duodenal ulcer are:

1. A careful history.
2. General physical examination.
3. Gastric analysis and general laboratory examination.
4. Roentgenologic examination.

It is important that one differentiate clearly between gastric and duodenal ulcer mainly, because of the frequency of malignancy in gastric ulcer.

Ambulatory management in most cases of duodenal ulcer is not only an economic necessity, but has been very satisfactory in the absence of marked obstruction, repeated hemorrhages and concomitant organic lesions.

BIBLIOGRAPHY

1. Willson, H. S.: A study of one thousand consecutive cases presenting gastrointestinal symptoms.
2. Horgan, E.: The more common forms of dyspepsia requiring surgical treatment.
3. Wilson, L. B., and Willis, B. C.: Pathological relationship of ulcer and carcinoma.

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EDITORIAL

The May Meeting

The time of our annual meeting is at hand. During the last month, the American Medical Association met in Dallas; doubtless, many of you were in attendance and unquestionably you all felt well repaid. In the coming month, the State Association meets in its annual conference, to review the work of the past year and to lay plans for the future. Many members question the value of these meetings, their purposes and their benefits. They feel that a few run the affairs of the Society and put their friends on the program, thus making it a closed corporation. This is a grave misconception which rests on unfamiliarity with the aims of the Association and with non-participation in the deliberation on the part of many doctors who are members in name only. To thoroughly understand the problem, it is necessary to discuss it in such a way that everyone will see it from the proper viewpoint.

Medical meetings are held for three purposes:

1. To direct the policies of physicians as an organization in their relation to the public.

2. The interchange of personal opinion, experience and ideas for mutual benefit.

3. To provide recreation and promote a better fellowship in the profession such as comes through personal acquaintance.

Since time immemorial, people interested in like things have banded together for protection of common interests. The members of the medical profession recognized this principle very early, for they knew that in union there was strength. We are all by nature more or less selfish; physicians are proud of their profession, their membership and its conduct. At first, when the societies were small, rules of conduct and policy could be formulated and acted upon by the membership as a whole, but as the associations grew, this part of the work had to be turned over to delegates, who make up the House of Delegates. These representative individuals are responsible for the government. It is their duty to elect officers and to look after the rights of physicians as a whole, to protect them from imposition on the part of irregular cults and to protect the public by acting as advisers on matters of public health. The officers report upon their activities to their constituents and are really the organized force. If a member feels that he is not represented, it is because he does not take part in the deliberations of the constituent county societies, who elect the membership to the House of Delegates. Active participation at home will obviate this feeling.

The second purpose is purely professional. The majority of physicians are interested in this phase, being content to allow the more aggressive and better qualified men to look after the governing end. Richard Cabot once said in a lecture that doctors of medicine should, like their commercial brothers, take an annual inventory of their work. This should not be limited to the financial side alone, but it should include the professional as well. Each year

every practitioner, whether he work in the remotest hamlet or in the most distinguished clinic, has the opportunity of observing certain phenomena of disease which are of particular interest from diagnostic, therapeutic or prognostic viewpoints. The results of these observations should be given over to the profession at large. Our meetings are so constituted that any member who has anything of interest to present may do so in a paper. To those men who feel that they are unable to present their views in writing, the discussions are open for the interchange of opinion. There is no phase of a medical meeting which brings out personal experience and observation and which makes such a lasting impression, as a spirited open debate. The tendency to make papers largely a review of the literature and quotation of statistics is deplorable. Medical literature is crammed full of such material which can be used to prove anything one wishes. A discussion on the other hand is largely personal and much more instructive.

Last, but not least, one must not overlook the recreational features. All work and no play makes Jack a dull boy. Doctors should never be too old to play. Good entertainment in the evening and such wholesome sport as golf are essential. A meeting devoted to scientific deliberations only is very fatiguing. What can be better to break down reserve and formality and to promulgate intimate acquaintance than active participation in sport. Here the pressing professional worries are forgotten and good fellowship displaces the petty jealousies of everyday competition.

If you keep these things in mind, it is obvious that you should attend the coming meeting. The chairmen of your various committees have worked hard and will have many interesting reports to make. The program committee has arranged an excellent scientific presentation and you may rest assured that the recreational features will come up to the traditional St. Paul excellence. No one is so big professionally that he will not profit by his attendance, nor is anyone so small that his opinion is not worth while. The success of the meeting is up to you and the personal interest you take in its deliberations. You will be the gainer, your patients will be benefited and the community from which you come will realize that they have in their midst a real progressive physician.

O. N. M.

The Medical Profession of Minnesota and the Sheppard-Towner Act

On April 20, 1921, the State Legislature of Minnesota authorized the State Board of Health to provide instruction and advice to expectant mothers, and also accepted the provisions of any Federal Act for promoting the hygiene of maternity and infancy. On November 23, 1921, Congress passed "An Act for the promotion of the welfare and hygiene of maternity and infancy, and for other purposes." January 10, 1922, the State Board of Health created a Division of Child Hygiene, approved the program outlined by its executive officer, and appointed the State Advisory Board on Maternal and Infant Hygiene. The recommendation for the formation of County Administrative Boards was also approved. The Federal funds became available to the State on March 28, 1922. On April 21, 1922, the State Advisory Board, which numbers among its members two practicing physicians, one pediatrician, and one obstetrician, suggested the formation of County Administrative Boards consisting of two physicians, one county commissioner, and two women. On May 10, 1922, the question of the formation of County Administrative Boards was taken up with the Secretary of the State Medical Association. The next day a letter was sent to the President of the State Medical Society regarding the County Administrative Boards. On June 16, 1922, a letter was also sent to the President of the State Medical Association relative to this matter. On this same date, Dr. E. C. Hartley was appointed Director of the Child Hygiene Division, which was organized on July 1, 1922. In August of that year, Dr. E. C. Hartley published an editorial in MINNESOTA MEDICINE entitled, "The New Child Hygiene Division—Its Relation to the Physicians of Minnesota." In this article the program of the Division was outlined. On September 23, 1922, a letter was sent to each county health officer and to the officers of the State and each District and County Medical Society relative to the plan of work, with the request that a physician be selected in each county to act on the County Administrative Board. On October 12, 1922, a letter was received from the President of the Minnesota State Medical Society recommending two physicians from each county to serve on these Administrative Boards. These recommendations were approved by the State Board of Health at a meeting held on October 25, 1922. On October 14, 1922, at the Annual Meeting of the House of Dele-

gates, a resolution, to indorse the action of the American Medical Association in condemning the Sheppard-Towner Act, was laid on the table, where it still lies. The Minnesota State Medical Association has apparently refused to support the American Medical Association in its action relative to the Sheppard-Towner Act.

The Medical Society of this State has co-operated in carrying out the provision of this Act since the work was begun in Minnesota. So far as the Maternal Hygiene is concerned, the formula has been very simple, namely, to educate the laity to seek professional advice from physicians wherever and whenever possible during pregnancy, labor, and the puerperium. This, of course, presupposes that the physicians are willing and ready to give this care to their patients. The author has been interested mainly in this phase of the work, and owing to some criticisms and actions has been impelled to write this statement of facts for the enlightenment of the medical men of this state. It is important in matters of this kind to have accurate information before opinions are formed, and decisive action taken. The work is still being carried on according to the original plan of co-operation with the medical profession of this state.

FRED L. ADAIR, M.D.

Annual Meeting

Spring was a long time in making its appearance this year. The usual monotony of winter practice was prolonged and emphasized by an epidemic. Anything like a vacation belonged to the realm of dreams. But a ray of hope was vouchsafed to us by the State Medical Society. MINNESOTA MEDICINE announced the State Medical Meeting, St. Paul, May 17-19.

You may leave your grind of work; in fact, it is quite possible your community is enlightened enough to expect you to do so.

Whether many of the items on the program appeal to you or not, there is no getting away from the fact that no one returns from a State Meeting without benefit. He has picked out at least some things he wanted to see or hear, he has seen some of his friends and somehow or other he feels a distinct stepping-up of his ability to tackle the next problems, whatever they may be.

One conceives an admiration for that program committee that started the 15-minute paper — a stroke of diplomacy! No longer do they have to beg of the eminent and perhaps temperamental specialist not to indulge his propensity for historical, pathological, theoretical or reminiscential details. They say: You have fifteen minutes to set forth what you know on the subject you select. And how it has worked! Every meeting that adopts that plan is well worth attending.

H. B. A.

Copenhagen Snuff

It is no unusual experience for physicians in this part of the country to encounter patients complaining of symptoms obviously the result of the snuff habit. Although snuff was fashionable a century ago, when the gentleman carried his snuff box and occasionally indulged in a sneeze, the present habit is quite different. Now the usual procedure among snuff users is to take a good-sized pinch of a finely cut tobacco known as Copenhagen snuff (made in Chicago) and place it under the lip or between the gum and cheek. The Copenhagen habit is apparently widespread in Minnesota and some neighboring states. Scandinavians, Danes and Finlanders are said to be particularly addicted, probably having been attracted in some instances by the name.

As pointed out several years ago by Hierscher,* users generally present rather characteristic symptoms. The pulse is usually elevated to a rate of 80 or 90 and the blood pressure may be moderately raised. While the heart is not increased in size, the heart tones usually sound harsh and rough, and a murmur may be elicited on exertion. Shortness of breath, palpitation and heart pain are the complaint. The writer has seen at least one instance of albuminuria which disappeared on discontinuing the use of snuff.

It has been frequently observed that habitual users—and the habit becomes very difficult to break —show an obtunding of intellect and moral sense. Users describe sensations similar to those produced by an alcoholic drink. The need for increasing amounts of snuff leads to the consumption in some instances of large quantities. The effect of this excessive use is so similar to that of narcotic drugs

*St. Paul Med. Jour., 1915, 17, 183.

that the suspicion of cocain or other narcotic content has frequently been voiced.

Unfortunately, no extensive analysis, so far as we have been able to learn, has ever been made to determine the constituents of Copenhagen snuff. Dr. E. D. Brown of the Department of Pharmacology of the University of Minnesota, a few years ago, made determinations of the nicotin content of Copenhagen snuff, but failed to find any other alkaloids present. His attention had been called to the presence of a partial anesthesia as well as a thickening of the lips among users in the employ of the Twin City street railways, and evidence of the presence of cocain particularly was sought.

If tobacco is the main constituent of Copenhagen snuff, it is difficult to explain why chewers of ordinary cut plug do not manifest similar symptoms. Probably, as Dr. Brown suggests, the comminution of the tobacco in snuff form permits greater absorption of the nicotin content both by way of the mucous membrane of the mouth and through swallowing. Nicotin, being volatile, is known to be readily absorbable through the mucous membrane and even through the intact skin. A well known stunt in army circles has been to place a large quid of tobacco in the arm-pit in order to obtain the toxic gastro-intestinal effects in feigning illness.

When we consider that the alkaloid, nicotin, is a volatile liquid, and that, according to Sollmann, approximately one grain is fatal to man and that an ordinary cigar may contain twice the fatal dose, it seems rather strange that the smoking of tobacco does not produce more serious effects. Tobacco varies in its nicotin content, that grown in Havana and Maryland, according to the same author, containing 1.5 to 3 per cent, while that from Virginia and Kentucky runs as high as 6 to 8 per cent. Some of the nicotin content is lost, it is true, in the curing of the tobacco leaf and the drier the tobacco the more nicotin is destroyed when smoked. Some of the symptoms produced by the use of tobacco in any form are undoubtedly due to the nicotin effect. The preliminary stimulation and later manifestations of depression of the central nervous system are the experimental findings with pure nicotin. The symptoms, too, in snuff users tally very closely with the effects produced by large doses of pure nicotin experimentally.

In 1913, North Dakota legislated against the use of snuff or its substitutes in any form. So-called Right-Cut chewing tobacco was declared to be essentially snuff. The use of common chewing tobacco was excepted. An illicit traffic in snuff made its appearance. The snuff was shipped into the state to individuals who guaranteed to deliver and collect for the contraband.

The question arises, of course, whether it is worth while to legislate against substances known to be injurious. General education as to the facts is of value.

The sum total of the experience of Minnesota physicians would furnish convincing proof of the insidious and deleterious effects of snuff used as chewing tobacco.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA STATE MEDICAL ASSOCIATION

The fifty-eighth annual session of the Minnesota State Medical Association will be held at the Masonic Temple, St. Paul, May 17 to 19, 1926. All meetings will be held in the Masonic Temple (corner Sixth Street and Smith Avenue), unless otherwise specified. The day following, May 20, will be devoted to clinics at the various hospitals in St. Paul under the auspices of the Clinical Section of the Ramsey County Medical Society. This will take the place of the usual St. Paul Clinic Week. Hotel headquarters will be at the Saint Paul Hotel.

OFFICERS

H. M. JOHNSON, M.D., *President*.....Dawson
W. F. BRAASCH, M.D., *1st Vice Pres*.....Rochester
A. N. COLLINS, M.D., *2nd Vice Pres*.....Duluth
E. G. MCKEOWN, M.D., *3rd Vice Pres*.....Pipestone
E. A. MEYERDING, M.D., *Secretary*.....St. Paul
EARLE R. HARE, M.D., *Treasurer*.....Minneapolis

COUNCILORS

FIRST DISTRICT
W. F. BRAASCH, M.D. (1927).....Rochester
SECOND DISTRICT
L. SOGGE, M.D. (Appointed to fill vacancy).....Windom
THIRD DISTRICT
H. M. WORKMAN, M.D. (1929).....Tracy
FOURTH DISTRICT
F. A. DODGE, M.D. (1928).....LeSueur
FIFTH DISTRICT
F. J. SAVAGE, M.D. (1929).....St. Paul
SIXTH DISTRICT
W. H. CONDIT, M.D. (1928).....Minneapolis
SEVENTH DISTRICT
J. G. MILLSPAUGH, M.D. (1929).....Little Falls
EIGHTH DISTRICT
G. S. WATTAM, M.D. (1928).....Warren
NINTH DISTRICT
W. A. COVENTRY, M.D. (Appointed to fill vacancy).Duluth

The Council will meet at the office of the State Association, 11 West Summit Avenue, at 10 A. M., Monday, May 17, 1926.

The House of Deelgates will convene at 2 P. M., Monday, May 17, in the Blue Room of the Masonic Temple. The second meeting for election of officers will be held at luncheon, Tuesday noon.

The Medical Economics meeting, our secretary, Dr. E. A. Meyerding, presiding, will be held in the auditorium of the Masonic Temple, May 17, at 8 P. M. The following program will be presented:

THE MEDICAL PROFESSION AND THE PRESS
Mr. Herbert R. Galt.....St. Paul
Managing Editor Dispatch and Pioneer Press

DEGENERATE DISEASES AND PERIODIC HEALTH EXAMINATIONS
Chas. P. Emerson.....Indianapolis
Dean Indiana University School of Medicine

THE WOMEN'S AUXILIARY
Mrs. J. T. Christison.....St. Paul
President of the Women's Auxiliary

FADS AND QUACKS
Morris Fishbein, M.D.....Chicago
Editor, American Medical Association Journal

PROBLEMS OF THE STATE MEDICAL ASSOCIATION
H. M. Johnson, M.D.....Dawson
President, Minnesota State Medical Association
C. B. Wright, M.D.....Minneapolis

The Medical and Surgical Sections will meet jointly throughout. The following program interspersed with clinical and pathological demonstrations will be offered:

TUESDAY MORNING — MAY 18
8:30 o'Clock
Auditorium, Masonic Temple

JOINT MEETING—MEDICAL AND SURGICAL SECTIONS

Theodor Bratrud, M.D., and C. B. Wright, M.D., Chairmen

MODERN METHODS OF TESTING THE ACUITY OF HEARING; DEMONSTRATION OF SEVERAL TYPES OF AUDIOMETERS.
Horace Newhart, M.D.....Minneapolis

CANCER OF THE LARYNX
Gordon B. New, M.D.....Rochester

ACUTE LARYNGEAL OBSTRUCTION
G. W. Adler, M.D.....Winona

SURGICAL TREATMENT OF PANCREATITIS
B. F. Davis, M.D.....Duluth

SYMPOSIUM ON INFANTILE PARALYSIS
ITS MECHANICAL TREATMENT
C. C. Chatterton, M.D.....St. Paul
ITS SURGICAL TREATMENT
M. S. Henderson, M.D.....Rochester
CORRELATION OF PATHOLOGIC AND CLINICAL PICTURES
J. C. McKinley, M.D.....Minneapolis
ITS BACTERIOLOGIC ASPECTS
E. C. Rosenow, M.D.....Rochester

CHOREA GRAVIDARUM—NEUROLOGICAL ASPECT
Frank Whitemore, M.D.....St. Paul

RECENT PROGRESS OF PSYCHIATRY
G. N. Ruhberg, M.D.....St. Paul

PSYCHOPATHIC HOSPITAL
S. T. Orton, M.D.....Iowa City, Ia.
Prof. Psychiatry, State Univ. of Iowa

AMNESIA, A CLINICAL STUDY
E. M. Hammes, M.D.....St. Paul

URETERAL STRICTURES
EDWARD BRATRUD, M.D.....Warren

TUESDAY AFTERNOON — MAY 18
1 o'Clock

MOVING PICTURES OF HUMAN INTESTINAL PROTOZOA
T. B. Magath, M.D.....Rochester

PERICARDITIS
Frank Spicer, M.D.....Duluth

SYMPOSIUM ON CARDIOVASCULAR RENAL DISEASE, WITH PRESENTATION OF CASES
Hilding Berglund, M.D., Professor of Medicine, University of Minnesota, Minneapolis, and
L. G. Rowntree, M.D.....Rochester
DISCUSSION WITH RELATION TO ARTERIAL HYPERTENSION
C. P. Emerson, M.D., Dean of Indiana Univ. Med. College, Indianapolis
RELATION TO SURGERY
V. C. Hunt, M.D.....Rochester

A CONSIDERATION OF CERTAIN FEATURES OF ANGINA PECTORIS
F. M. Smith, M.D., Prof. Theo. and Prac. Med. University of Iowa, Iowa City, Ia.

SURGICAL TREATMENT OF PERIDUODENITIS
E. P. Quain, M.D.....Bismarck, N. D.

DIAGONAL END-TO-SIDE ANASTOMOSIS
A. N. Collins, M.D.....Duluth

TREATMENT OF SOME INJURIES AND INFECTIONS OF THE HAND
M. O. OPPEGAARD, M.D.....Crookston

HYDROCEPHALUS—SURGICAL TREATMENT
E. W. Johnson, M.D.....Bemidji

TWELVE CASES OF TRICHINOSIS
F. S. Richardson, M.D.....Belgrade

THE ANNUAL BANQUET
TUESDAY EVENING, 6:30
Saint Paul Hotel

TOASTMASTER
J. T. Christison, M.D.....St. Paul

"OUR GUESTS"
President C. C. Chatterton, M.D.....St. Paul

"WELCOME"
Mayor Arthur E. Nelson.....St. Paul

"LAND O' LAKES"
Governor Theo. Christianson.....St. Paul

"THE STATE ASSOCIATION"
W. L. Burnap, M.D., Past President.....Fergus Falls
H. M. Johnson, M.D., President.....Dawson
The President-elect

"THE UNIVERSITY"
President L. D. Coffman.....Minneapolis

"ENERGY OF LIGHT"
Chas. H. Mayo, M.D.....Rochester

"OUR PROFESSION"
Chas. P. Emerson, M.D.....Indianapolis

WEDNESDAY MORNING — MAY 19
8:30 o'Clock

Auditorium, Masonic Temple

JOINT MEETING—MEDICAL AND SURGICAL SECTIONS

Theodore Bratrud, M.D., and C. B. Wright, M.D., Chairmen

RELATION OF RETRO-PERITONEAL FAT TO ABDOMINAL HERNIA
C. A. Roeder, M.D., Asst. Prof. Surgery, University of Nebraska, Omaha, Nebraska

CLINIC ON DISEASES OF THE THORAX
W. S. Lemon, M.D.....Rochester
and
S. W. Harrington, M.D.....Rochester

TREATMENT OF EMPYEMA IN THE HOME
H. J. Lloyd, M.D.....Mankato

ASSOCIATED HYPERTHYROIDISM AND PREGNANCY
W. A. Coventry, M.D.....Duluth

INSTALLATION OF OFFICERS

TREATMENT OF ATHLETIC INJURIES
C. W. Spears, M.D.....Minneapolis

BRANCHIAL CYSTS
J. A. Johnson, M.D.....Minneapolis

ECTOPIC GESTATION: DEFINITION, CLASSIFICATION, CONSIDERATION
R. J. Hodapp, M.D.....Willmar

CLEFT PALATE
J. J. Gelz, M.D.....St. Cloud

X-RAY OBSERVATIONS IN PNEUMONIA
L. G. Rigler, M.D.....Minneapolis

WEDNESDAY AFTERNOON — MAY 19
1 o'Clock

MOVING PICTURES OF THE STOMACH
Lewis Gregory Cole, M.D.....New York City

SYMPOSIUM ON OBSTETRICS

MATERNAL MORBIDITY AND THE GENERAL PRACTITIONER
H. B. Aitkins, M.D.....LeSueur

SACRAL ANESTHESIA IN OBSTETRICS
O. J. Seifert, M.D.....New Ulm

RURAL OBSTETRICS AND A COMPARATIVE STUDY OF ITS RELATION TO PUERPERAL MORTALITY STATISTICS
W. A. Piper, M.D.....Mountain Lake

DISCUSSION
Roy Swanson, M.D.....Crookston
and
C. O. Maland, M.D.....Minneapolis

BLOOD VESSEL SURGERY
J. DeJ. Pemberton, M.D.....Rochester

CLINIC ON GASTRIC DISEASES
Arnold Schwyzer, M.D.....St. Paul

SURGERY OF THE INFANT ABDOMEN
A. A. Zierold, M.D.....Minneapolis

UROLOGIC DIAGNOSIS IN GENERAL SURGERY
A. E. Sohmer, M.D.....Mankato

SOME ABNORMAL FINDINGS IN DIABETES
Donald McCarthy, M.D.....Minneapolis

BLINDNESS ASSOCIATED WITH CARBON MONOXID POISONING
W. R. Murray, M.D.....Minneapolis

On Wednesday evening, May 19, the Ramsey County Medical Society will be hosts to visiting members and ladies with an entertainment and dance. The program will be furnished exclusively by members of the profession and their families.

St. Paul Clinic Week will be limited this year to one day (May 20), the day following the State meeting. Clinics will be held at the Ancker, Miller, St. Joseph's, St. Luke's, St. John's, St. Paul's, Bethesda, Mounds Park, Northern Pacific and Gillette State hospitals. Extensive preparations for a day of valuable clinics are being made by the Ramsey County members. Clinics will be both operative and dry and demonstrations of various instruments and technic will be given by members of the local hospital staffs.

The Women's Auxiliary of the State Association will hold its annual meeting Tuesday at 2:30 P. M. at the Minnesota Club. In addition to the election of officers for the ensuing year the meeting will be addressed by the president, Mrs. J. T. Christison, Dr. Morris Fishbein, editor of the A. M. A. Journal, and Dr. H. M. Johnson, president of the State Medical Association. The annual banquet of the Auxiliary will be held Tuesday evening at the Minnesota Club, Mrs. H. J. O'Brien acting as toastmistress. Auto rides are planned for Monday afternoon, cars leaving the Minnesota Club at 2:00 and 3:30, to be followed by a reception at the Gillette Hospital. Visiting ladies are, of course, invited to the Medical Economics meeting Monday evening and to the Wednesday evening entertainment as guests of the Ramsey County Society.

The various committees of the State Medical Association and the officers of the component county societies as well as the membership of the entire Association appears in the roster published in this number of the journal.

CLINICAL DEMONSTRATIONS AND SCIENTIFIC EXHIBITS

The clinical demonstrations and exhibits will be held at the time and place announced on the bulletin board at the Registration Desk.

EXPERIMENTAL GLOMERULONEPHRITIS

E. T. Bell, M.D., and B. J. Clawson, M.D., Department of Pathology, University of Minnesota, will show their recent work on experimental chronic glomerulonephritis and embolic glomerulonephritis. In addition they will have a display of hearts showing various types of valvular and muscular disease. Microscopic sections and drawings will be exhibited.

CANCER OF LARYNX

Dr. Gordon B. New of the Mayo Clinic, Rochester, will have a demonstration of 10 larynx specimens removed at operations for cancer.

HUMAN INTESTINAL PARASITES

T. B. Magath, M.D., of the Mayo Clinic, Rochester, will present a moving picture film of Human Intestinal Parasites.

BEDSIDE TESTS FOR BLOOD SUGAR

Hilding Berglund, M.D., Professor of Medicine, University of Minnesota, will give a demonstration of laboratory

and bedside methods for determination of blood sugar. Colorimeters will be on display and a demonstrator will be in charge.

IMMUNIZATION DEMONSTRATION

W. P. Larson, M.D., Woodard Colby, M.D., St. Paul; E. J. Huenekens, M.D., Minneapolis; D. C. Lochead, M.D., Rochester, will give a demonstration of work with soap in connection with diphtheria, scarlet fever and tetanus. By mixing soap with the above toxins, they are rendered harmless and immunization results in apparently as great a number of instances and in a much shorter space of time than by the usual method. In addition, serum sickness is avoided. This method has been in use for some time, and its value is apparently established. Dr. Larson will show animals injected with pure toxin and other animals injected with toxin and soap. This guinea-pig demonstration is very striking.

SKIN CLINIC

A skin clinic will be conducted under the direction of H. N. Klein, M.D., and associate clinicians from the Ramsey County Medical Society. Patients will be present and clinicians will discuss the cases with the visiting physicians.

OPHTHALMOSCOPIC DEMONSTRATION

An ophthalmoscopic demonstration under the direction of J. F. Fulton, M.D., and associate clinicians from Ramsey County Medical Society will be conducted so as to give the visiting physicians an opportunity to make actual examinations. The importance of the use of the ophthalmoscope to the general practitioner will be emphasized.

DEMONSTRATION OF THE STETHOPHONE

Demonstration of the stethophone by S. Marx White, M.D., and associates. This apparatus is a device for broadcasting heart sounds. Each physician should bring a stethoscope with a straight tube for connecting with a monoaural phone. Both normal and abnormal sounds will be demonstrated.

DIAGNOSIS AND CONTROL OF DIPHTHERIA

Albert J. Chesley, M.D., will show a moving picture film illustrating the diagnosis and control of diphtheria.

SCOTT-CARVER COUNTY MEDICAL SOCIETY

The regular quarterly meeting of the Scott-Carver Medical Society was held April 8, 1926, at Shakopee, Minn., when members were entertained at dinner at the Pelham Hotel by the President, Dr. F. H. Buck.

Dr. E. F. Robb of the Abbott Hospital, Minneapolis, addressed the society on "The Care of Premature Infants and the Treatment of Colic and Eczema in Children."

New members elected were Dr. H. D. Nagel of Waconia and Dr. C. F. Wohlrabe of Young America.

Dr. Herman Johnson, president of the State Medical Association, and Dr. E. A. Meyerding, secretary, were in attendance. Both gave brief talks on the work being done by the State Association as well as plans for the future. A motion was made and carried favoring an increase in yearly State Association dues to $15.

OF GENERAL INTEREST

Dr. G. S. Delamere, formerly of the Mayo Clinic, Rochester, and later of Oakland, California, is now practicing at Marysville, California.

Dr. Julius Jensen, formerly of Starbuck, is now located in Minneapolis, where he has established offices in the Physicians and Surgeons Building.

Dr. and Mrs. Charles N. Hensel of St. Paul left April 15 for Vienna, where Dr. Hensel will take post-graduate work in internal medicine. They will return some time in September.

In addition to the examination held by the American Board of Otolaryngology at Dallas on April 19 and at San Francisco on April 27, another examination will be held at the Otolaryngological Clinic, Royal Victoria Hospital, Montreal, on Tuesday, June 1.

Information may be secured from the Secretary, Dr. H. W. Loeb, 1402 South Grand Boulevard, St. Louis, Missouri.

The new contagious department of the Ancker Hospital, St. Paul, is now under construction. It will be a five-story structure on the north of the present contagious building and will be ready for use in January, 1927. The total bed capacity of the contagious building when completed will be 280.

Dr. H. M. Johnson, president, and Dr. E. A. Meyerding, secretary, Minnesota State Medical Association, recently attended Medical Economics Meetings of the following component societies: Scott-Carver County Medical Society, Mower County Medical Society, Waseca County Medical Society, Freeborn County Medical Society, Steele County Medical Society, Rice County Medical Society and Goodhue County Medical Society. At each of these Societies a resolution was passed endorsing the raising of the dues of the Minnesota State Medical Association from five dollars to fifteen dollars per year. These meetings have attracted considerable attention and secretaries report that they were the largest and best meetings held during the year.

UNIVERSITY NEWS

Announcement was made last month of a gift of $200,000 by William Henry Eustis to the University of Minnesota, in addition to the sum of more than $1,500,000 previously donated for a home and hospital for crippled children.

A gift of $80,000 by Dr. George G. Eitel of Minneapolis in the form of an assignment of insurance policies was also announced. Provision is made in the bequest that the income on the policies shall be paid to his wife during her lifetime, after which the entire sum reverts to the University for the establishment of a medical school scholarship and a research fund.

STATE BOARD NEWS

The State Board of Health requests every practicing physician in Minnesota to assist in eradicating diphtheria. A plan submitted through Dr. H. M. Johnson, President of the State Medical Association, to the proper committees of the Association was endorsed.

This plan provides:

1. That medical societies initiate systematic county-wide toxin-antitoxin work in co-operation with health officers of counties, cities and villages and the school authorities.
2. That public schools be used as inoculation centers.
3. That special effort be made to get parents to protect all children between six months and 12 years of age against diphtheria through the use of toxin-antitoxin.
4. That the records of all children receiving toxin-antitoxin or Schick test, whether of school or pre-school age, be preserved locally in a central file or files.
5. That the county public health nurse, the superintendent of schools or city school nurse have charge of these files and so make them available at all times for reference of the parents, the family physician and health authorities.
6. That in order to promote the general use of toxin-antitoxin a plan similar to the Martin County Medical Society plan be adopted, setting uniform fees for the administration of toxin-antitoxin to individuals in physicians' offices and in homes and for the inoculation of large school groups and of small rural schools. It works well in Martin County.

President Johnson suggests that physicians first give toxin-antitoxin to their own children under 12 years of age and then to children of well informed patrons, thus establishing public confidence in the safety and dependability of toxin-antitoxin.

The diphtheria situation is shown by the enclosed notes, entitled "Diphtheria in Minnesota," prepared by the Division of Vital Statistics and the Division of Preventable Diseases of the State Department of Health, for use in schools and newspapers. Additional information for each county will be sent later to the County Health Officer.

To aid in informing the people about the protection toxin-antitoxin gives against diphtheria, the State Department of Health will loan the one-reel films supplied through the courtesy of the Metropolitan Life Insurance Company and the John Hancock Mutual Life Insurance Company. Transportation charges both ways must be paid by the authorities who use the films. Literature of attractive type prepared by recognized authorities and approved by the State Board of Health for use by local boards of health may be secured by health officers free upon request sent to the home offices of the John Hancock Mutual Life Insurance Company, Boston, Mass., or the Metropolitan Insurance Company, New York City, or from the local representatives of these companies. The presidents of these two companies have instructed their local representatives to co-operate in the campaign against diphtheria.

The State Department of Health, Old Capitol, St. Paul, will mail free of charge upon request of physicians and health officers the required amount of toxin-antitoxin for treatment of the number of children mentioned in the request. Record-consent cards providing for parents' signed consent for inoculation of the child and for history on one side, and for record of inoculations and the Schick test, etc., on the other side, will be supplied free either before the toxin-antitoxin is sent out or with it, as requested by the physician or health officer.

Toxin-antitoxin will be supplied in the kind of package requested as far as funds permit:

(a) 30 c.c. vial.

(b) 10 c.c. vial.

(c) Individual package of 3 vials, 1 c.c. each. As the State pays as much for the individual package as for the 10 c.c. vial, due economy in its use is requested.

Toxin and the saline solution for preparing the Schick test mixture will be mailed free with the following restrictions:

1. One 50 test outfit when request states that 25 to 50 persons are to be tested at once.
2. One 100 test outfit when request states that 50 to 100 persons are to be tested at once.

This restriction is necessary to prevent waste of Schick test material which must be used within twenty-four hours after the toxin is diluted with the saline solution. Outfits containing less material than is needed for 50 Schick tests are not made.

Any county, city or village where toxin-antitoxin work is being carried on or has been arranged for will be supplied with toxin-antitoxin or Schick material, for test of immunity 6 months after inoculation, free of charge upon receipt of a report from the health officer stating what has been done and what supplies are required to continue the work. Any physician desiring toxin-antitoxin for inoculation of residents of Minnesota may secure it free of charge.

Every request must state the number of persons to be inoculated or Schick tested and the kind of package preferred.

Send requests to STATE DEPARTMENT OF HEALTH, Old Capitol, St. Paul, Minnesota.

DIPHTHERIA IN MINNESOTA

Minnesota was one of the first states to apply culture diagnosis as a means of diphtheria control. In New York City, the culture method was first used for diphtheria diagnosis. Dr. W. H. Park, in May, 1893, began routine bacteriological examinations for diphtheria in the New York City health department laboratories. In Minnesota, Dr. Charles N. Hewitt began routine laboratory examinations for diagnosis of diphtheria in October, 1894.

The classification of diphtheria bacilli worked out in the State Board of Health laboratories by Drs. F. F. Wesbrook, L. B. Wilson and O. McDaniel was described in the Transactions of the American Public Health Association, published in 1899. It was at once recognized to be of great practical value and public health laboratories both in America and in Europe have adopted this classification for recording types of B. diphtheriæ in routine microscope examinations of nose and throat cultures.

Antitoxin as a therapeutic agent was introduced in the United States in 1895. Antitoxin had a marked effect on the diphtheria death rates in the Registration Area. The Director of the Federal Census Bureau, commenting on the rates from diphtheria and croup for the Registration states, says the rates "indicate a most remarkable downward trend and stand out as everlasting monuments to the wonderful

progress of medicine. In 1900 the rate was 44 per 100,000 population, in 1910 it had fallen to 25.7 and in 1920 to 19.6. For the age period under 1 year the rate fell from 131.8 in 1900 to 58.6 in 1920 and for children aged 1 to 4 years the rate fell from 270.9 in 1900 to 109.6 in 1920."

In Minnesota, antitoxin was not used extensively for about ten years after its introduction. The continued high death rate led the State Board of Health to take action to make antitoxin available for early use in every case.

In 1906 (November) the Board arranged with Lederle for sale of antitoxin to local health officers at 30 per cent below list price for use among the poor.

In 1909 (April), 55 distributing stations were established.

In 1915 (August), $5,000 appropriated by the legislature for free antitoxin for general use in all cases became available and 283 stations were established.

In 1917, the appropriation was increased to $7,000 per annum.

In 1919, the appropriation was increased to $10,000 per annum.

In 1925, the appropriation was increased to $15,000 per annum.

In Minnesota there are now 370 distributing stations.

Antitoxin reduced diphtheria deaths as its use became general in Minnesota from about 33 in 1900 to about 10 in 1920.

During the past eight years, 1918-1925, there has been at all times an ample supply of free antitoxin throughout the state. Faithful use of our present methods of treatment and control have not caused a continuous reduction in the death rate per 100,000 population or in the deaths per 100 cases.

Diphtheria death rates per 100,000 population of Minnesota

1918	1919	1920	1921	1922	1923	1924	1925
12.2	12.7	10.2	9.1	7.8	8.4	8.6	9.0

Diphtheria fatality rates per 100 cases in Minnesota:

1918	1919	1920	1921	1922	1923	1924	1925
%	%	%	%	%	%	%	%
7.75	6.65	6.72	5.02	4.49	4.76	5.53	6.11

Cases	3,674	4,541	3,616	4,380	4,270	4,431	3,941	3,778
Deaths	285	302	243	220	192	211	218	231

32,631 cases with 1,902 deaths, average fatality 5.8 per cent, occurred in

	Minneapolis		St. Paul		Duluth		State	
Year	Cases	Died	Cases	Died	Cases	Died	Cases	Died
1918	1,007	88	951	59	172	11	1,544	127
1919	920	68	1,308	80	410	20	1,903	134
1920	649	45	938	58	178	15	1,854	125
1921	1,452	51	853	37	200	11	1,875	121
1922	1,276	50	730	35	176	4	2,088	103
1923	1,138	52	1,006	50	141	9	2,146	100
1924	1,332	70	914	34	162	2	1,533	112
1925	1,717	108	805	32	21	0	1,235	91

Deaths per 100 cases: Minneapolis, 5.6; St. Paul, 5.1; Duluth, 4.9; State, 6.4.

Age	Cases	Per Cent of All Cases	Deaths	Per Cent of All Deaths	Deaths per 100 Cases
Under 5	4,881	14.95	687	36.12	14.1%
5 - 9 yrs.	9,222	28.26	692	31.12	6.4%
10 - 14	6,091	18.66	245	12.88	4.0%
15 - 19	2,941	9.01	97	5.09	3.3%
20 and up	7,753	23.75	281	14.77	3.6%
Unknown	1,743	5.36	0		
Under 1 yr.	445	1.36	68	3.57	15.3%

This group is included in the group "Under 5" above.

Diphtheria can be eradicated if the discoveries of scientific medicine are systematically and persistently applied. Its cause and its mode of spread are known. A means for exact diagnosis, a scientific remedy for treatment which also gives temporary immunity, a reliable test for susceptibility, a safe agent for producing lasting immunity, are all at hand. Under these circumstances why permit our children to run the risk of sickness and death that the diphtheria statistics of Minnesota, 1918-1925, show?

TOXIN-ANTITOXIN

Diphtheria toxin-antitoxin, as the name implies, is a combination of diphtheria toxin and diphtheria antitoxin. Its use to protect children against diphtheria was first suggested by Dr. Theobald Smith in 1907, who discovered, quite accidentally, in his work on the standardization of diphtheria antitoxin for the Masachusetts State Board of Health that guinea pigs receiving both toxin and antitoxin remained immune for at least 2 years.

In 1913, Dr. von Behring in Berlin first used toxin-antitoxin to immunize human beings. In 1914, Dr. W. H. Park, Director of Laboratories of the New York City Health Department, began to manufacture and use toxin-antitoxin. Through the efforts of Dr. Park and his co-workers, the production and standardization of this product have been perfected and the value of this method of immunization has been demonstrated.

In 23 representative American cities where the death rate since 1918 has fallen an average of 10.3 per cent each year, the fall has been coincident with the general application of toxin-antitoxin by the health departments.

In New York City, the diphtheria death rate per 100,000 population dropped from 18.4 in 1920 to 11.9 in 1924. This reduction coincided with the immunization of 350,000 children since 1920. In the face of increased population, diphtheria deaths dropped from 1,239 in 1919 to 714 in 1924 and reported cases from 14,000 to 9,700.

In Syracuse, N. Y. (population 172,000), as a direct result of the administration of toxin-antitoxin to large numbers of children, the diphtheria death rate fell in 1925 to 2.6 from a rate of 9.0 in 1924, the lowest previous rate in the city's history.

In New Haven, Conn. (population 163,000), the diphtheria death rate was 1.7 per 100,000 population while the rate for the state of Connecticut was 11.2. The decline in New Haven followed an intensive immunization campaign of several years' duration while no corresponding campaign was carried out in the state as a whole.

In Seneca Falls, N. Y. (population 6,000), there had been an average of 22 cases among school children during each of the 5 years preceding the use of toxin-antitoxin. During the year following its use there was but one case among children.

In Youngstown, Ohio (population 132,000), following a campaign of immunization in which 22,000 children were immunized, there were 316 cases and 27 deaths in 1924 compared with 1,025 cases and 147 deaths in 1923.

Martin County was the first county in Minnesota to adopt a systematic county-wide program for immunization against diphtheria. Over 2,300 or about 90 per cent of the school children and hundreds of pre-school children received three doses of toxin-antitoxin in 1925.

THE SCHICK TEST

As diphtheria bacilli grow they produce a poisonous substance called toxin. If a very tiny amount of this toxin is injected into the skin of an immune person nothing happens, but if a similar amount is injected into the skin of a susceptible person after a short time the skin becomes reddened and a little swollen about the point of injection.

The Schick test in this way will tell us who is susceptible and who is immune to diphtheria. From 75 to 80 out of every 100 adults are immune to diphtheria. At birth about 75 to 80 of all infants are immune to diphtheria. The rule is if the mother is immune the offspring will be immune, and if the mother is susceptible to diphtheria the offspring will be susceptible, also. The newborn infant gradually loses the protection, immunity, transmitted to him from his mother and becomes quite susceptible at or before the age of two years. From the second to the sixth year the larger number of children are most susceptible to diphtheria. It is therefore apparent that ideally children should receive toxin-antitoxin immunization between the ages of 6 months and 2 years. In the campaign for the immunization of school children this fact should not be forgotten.

Dr. W. H. Park said, in an address at the Annual Meeting of the State Committee on Tuberculosis and Public Health of the State Charities Aid Association, New York City, May 8, 1925:

"What I want you all to believe is that toxin-antitoxin is in little children a harmless preventive against diphtheria. Here in New York City some time ago we gave each of two thousand infants when three days old a full man's dose without the slightest harm. The younger the child, the greater the need and the less the reaction. Don't wait until the child reaches school age. The great mortality is in the little children of the first, second and third years of age."

At the State Sanitary Conference last November, the health officers of Minnesota requested the State Department of Health to supply toxin-antitoxin and material for Schick test free of charge throughout the state.

The State Board of Health acted favorably on this request at its January meeting and will issue free of charge upon request of physicians and health officers the materials for immunization against diphtheria.

The Board will co-operate with the school and health authorities and the county medical societies throughout the state for the purpose of giving protection to school children and especially to children between 2 and 6 years of age who, as shown by the statistics, have the highest death rates from diphtheria.

NEW AND NON-OFFICIAL REMEDIES

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

CUTTER LABORATORIES:

Typhoid-Paratyphoid Prophylactic

EFFICIENCY PRODUCTS CO.:

Hoffman's Non-Nutritive Nut Flour

MEAD, JOHNSON & CO.:

Mead's Powdered Lactic Acid Milk (Cultured)

Mead's Powdered Lactic Acid Milk (Acidified with Lactic Acid U.S.P.)

H. K. MULFORD CO.:

Carbon Tetrachloride-Mulford

Capsules Carbon Tetrachloride-Mulford, 0.3 c.c.

Capsules Carbon Tetrachloride-Mulford, 1 c.c.

Capsules Carbon Tetrachloride-Mulford, 3 c.c.

PARKE, DAVIS & CO.:

Parke, Davis & Co.'s Standardized Cod Liver Oil

SQUIBB & SONS:

Scarlet Fever Streptococcus Antitoxin-Squibb, for the Blanching Test, 1 c.c. vials

SWAN-MYERS CO.:

Concentrated Pollen Extracts-Swan-Myers, 2 c.c. vials; capillary tubes

TRUTH ABOUT MEDICINES

Hoffman's Non-Nutritive Nut Flour.—A preparation prepared from Tagua palm nuts, composed chiefly of unassimilable carbohydrates (mannans). This product is used as a means of filling out restricted diets. It is a non-nutritive food substance used to give bulk to foods, thus serving to satisfy hunger without furnishing nourishment. Efficiency Products Co., Somerville, N. J. (Jour. A. M. A., Mar. 20, 1926, p. 842.)

Carbon Tetrachloride-Mulford.—A brand of carbon tetrachloride-U.S.P. It is marketed in the form of capsules containing, respectively, 0.3 c.c., 1 c.c. and 3 c.c. H. K. Mulford Co., Philadelphia. (Jour. A. M. A., Mar. 20, 1926, p. 842.)

Ragweed Combined Pollen Antigen-Lederle.—For a description of the method of preparation and the form of marketing, see New and Non-official Remedies, 1925, p. 207. Lederle Antitoxin Laboratories, New York. (Jour. A. M. A., Mar. 20, 1926, p. 842.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of February 10, 1926

The Minnesota Academy of Medicine held its regular monthly meeting at the Town & Country Club on Wednesday evening, February 10th, 1926, at 8 o'clock. Dinner was served at 7 o'clock. There were 28 members present.

The meeting was called to order by the President, Dr. H. L. Ulrich.

The minutes of the January meeting were read and approved.

This meeting was given over entirely to the presentation of clinical case reports, and the following members reported cases:

Dr. F. L. ADAIR reported two cases as follows:

Case 1. Mrs. H., age 23. Patient had a normal menstrual period in November. The December period was a few days late. She had a fainting spell, and on one occasion complained of headache and soreness of the eyeballs. The diagnosis was: possible pregnancy, with threatened abortion. On January 26, 1926, the patient came to the office. She had flowed from January 22nd to 24th; not quite so much as normal, and no pain. She complained of dizziness and syncope, and lacked endurance. She had slight nausea in December after the fainting spell. She fainted on January 21st. Had headaches occasionally.

The pelvic examination was negative. Vagina: slight, thin, pinkish discharge. Adnexa: elongated mass in the right adnexal region, about 3 to 4 cm. in diameter. Diagnosis: tubal pregnancy.

On January 28th she was operated upon; hydrosalpinx. Median abdominal incision was made, omental adhesions were freed, the right hydrosalpinx was removed, and right salpingectomy. No drainage.

Case 2. Mrs. S., aged 43. Patient was first seen in April, 1922, aged 39, married 3 years, no pregnancies. She complained of constant pulling, dragging pain in the hypogastric region when on her feet. A generalized urticaria and generalized brownish pigmentation were noted. Her menses had occurred regularly every 4 weeks, duration 6 days, and associated with cramps in the lower abdomen during the flow.

The physical findings were negative with the exception of a third degree retroversion of the uterus and possible gastroptosis. A pessary was inserted to correct the retroversion. This treatment was continued until April, 1925, when the pessary was removed. The patient was improved.

The skin condition improved after vaccination in November, 1924, but troubled her again in March, 1925, especially with menses.

The patient was seen in August, 1925. She was very nervous. She was about two and a half weeks past her period, and the last time had gone over about ten days. The uterus was about normal in size, retroflexed and retroverted third degree, not enlarged or softened, and no bluish coloration.

The patient was not seen again until December 18, 1925. She had had a normal menstruation in September and had been spotting ever since. The afternoon of December 18th she was seized with a sudden pain in the abdomen, felt faint, and went into collapse, and was found on the floor. Dr. J. D. was called and found the patient in a serious condition, pale, rapid pulse, and some shock. A mass was palpable in the right lower quadrant of the abdomen, with considerable tenderness. Dr. J. D. called me about 7:30 p. m. and I saw the patient about 8 p. m., at which time her pulse was almost imperceptible at the wrist. She was very pale and had thirst and air-hunger. Her blood pressure was between 30 and 40 systolic. She was immediately sent to the hospital and given a hypodermoclysis of normal saline solution. She was operated upon under gas and local anesthesia.

The uterus was found with a large mass in the right horn, which had two points of rupture, bleeding into the peritoneal cavity. This mass was delivered through the incision and a supracervical hysterectomy was done. Some blood was removed from the abdomen, mixed with citrate solution and replaced. Following the operation, the patient was very restless, went into collapse and died.

Gross findings: A tender mass in the right lower quadrant of the abdomen. Peritoneal cavity was full of blood. Connected with the right horn of the uterus was a large mass so that the uterus was about three times normal size.

Final diagnosis: Intraperitoneal hemorrhage; probably ruptured interstitial pregnancy.

DR. EMIL S. GEIST reported two cases of foreign body in the knee joint under the semilunar cartilage.

DR. A. SCHWYZER reported a case of carcinoma of the fundus of the gallbladder, and a case of carcinoma of the stomach.

DR. HARRY P. RITCHIE showed a series of pictures of before and after operations upon congenital cleft lips. The results indicated that in the repair of this cleft the procedure was not a special hare-lip operation, but one of general surgery, i. e., the union of a cleft sphincter muscle —the obicularis oris. The exact outlines of this muscle could be demonstrated by the use of the faradic current.

The results, not only in function, but in looks and growth, depended upon the precision with which this union was accomplished.

DR. A. E. BENJAMIN reported three goiter cases as follows:

Case 1. Mrs. C. E. McK., aged 33, married, weight 97¾ pounds. Complained of nervousness, insomnia, nausea and vomiting, diarrhea, tremor of hands and loss of weight. She had had diseased tonsils removed November 20, 1925. She had had appendicitis as a child, and smallpox at the age of 23. She had had asthma for 10 years.

Physical examination: Head: hair abundant, acne on the face, eyes bulging, staring, nystagmus. The neck showed an enlarged thyroid, right lobe larger than the left. Lungs were normal. Heart: rate 120, blood pressure, 170/80. Skin: iodism.

Laboratory: Urine: 12/12/25 normal. Blood: 1/16/25, Hb. 78%, w.b.c. 6,800. Blood urea 50.92. Basal metabolism: 10/18/25, 60% plus: 12/24/25, 45%.

She was given Lugol's solution by rectum, luminal, quinin hydrochlorate, bromides, and special diet.

Thyroidectomy was performed 12/29/25. Pathological report: colloid and fetal adenomata.

While in the hospital the pulse and blood pressure came down to normal in two days, no fever, and the patient made excellent progress. In four weeks she weighed 103¾ pounds.

The interesting points in this case are: (1) The pronounced toxic symptoms—loss of weight, diarrhea, vomiting, high blood pressure, rapid pulse, inability to take Lugol's solution by mouth, and high basal metabolism. (2) The regaining of weight and normal health.

Case 2. Miss G. E. V., aged 19, single, weight 110 pounds, height 5 ft. 7 in. Patient complained of tremor, nervousness, insomnia, difficulty in swallowing, loss of weight, and goiter.

The patient was told that she had a goiter as a child. This fall she noticed the glands enlarged and so consulted a doctor, who prescribed Lugol's solution last September. During the last month she became nervous, had nervous spells in which she had tremor of the hands, sensations of choking, and then fainted. Patient lost 10 pounds this winter. She becomes easily fatigued. Her hands often tremble and perspire freely. Her eyes blur and ache.

The patient had measles and diphtheria as a child; influenza in 1918, and has had tonsilitis frequently. Her menses began at the age of 15, pains during and after, irregular 10 to 40 days, duration 4 days.

Physical Findings: Eyes, frequent winking, nystagmus, lid lag, staring. Tonsils, inflamed, cryptic and submerged. The thyroid is definitely enlarged, right lobe nodular. Heart, rate 90; blood pressure 114/80. Lungs negative. Breasts have small palpable nodules. Reflexes normal. Skin is ruddy, warm and moist. There was acne present. The uterus is retroflexed, movable and of normal size. The ovaries are prolapsed.

Laboratory: 1/11/26, Hb. 85%, w.b.c. 7,100. 2/9/26, Hb. 90%. Urine, 1/11/26, negative. Basal metabolism, 1/11/26, plus 03%. Eight days after operation plus 37%.

Thyroidectomy was performed 1/12/26. Both lobes were enlarged about two and a half times the normal size, the right being irregular and nodular. The left lobe extended more posteriorly than the right, and was uniformly enlarged.

Tissue report: Section showed acini very large and containing deeply staining colloid. Cells were low cuboidal. There were nests of round cells in the interstitial tissue which may indicate past activities.

Course in the hospital: Before the operation the pulse was 90, temperature 98.6, respiration 20. After the operation the pulse was 130, temperature 102, respiration 28, for five days. Then the pulse was 120, temperature 99, and respiration 28, for eight days. Then, for three days, pulse was 100, temperature 98.6, and respiration 25. After that the pulse was 90, temperature normal, and respiration 22.

After leaving the hospital, the blood pressure was 100/50 on 2/9/26, and the pulse was 84.

The interesting points in this case are: (1) Goiter symptoms, but the preoperative basal metabolism was plus 03; (2) Postoperative at eight days, the basal metabolism was plus 37, pulse rapid and patient very nervous; (3) Return to practically normal health and absence of nervous symptoms at the present time.

Case 3. Mrs. A. C. U., aged 41, married, weight 175 pounds. Complains of nausea and vomiting, constipation, nervousness, sallow skin, and backache.

The patient had had measles, scarlet fever, smallpox, and rheumatic fever as a child, and diphtheria at the age of 20, and influenza in 1919. She had had an appendectomy and salpingectomy in 1907, and tonsillectomy in 1919. She has bronchitis during the winter. She had had eczema on the scalp and ears for months. Has had backache for years.

She smokes about ten cigarettes daily, and drinks liquor at times. Her father died at 68 of gastric cancer, and one sister died of pulmonary tuberculosis.

Physical examination: The skin is sallow and icteric; eczema on the scalp and ears. The eyes are staring. Teeth negative. The thyroid is enlarged. Blood pressure 124/80. Abdomen: tenderness and resistance along the right costal margin. The liver is high and the liver outline is smaller than normal. Leucorrhea. Rectum is tender.

Laboratory: Urine normal 1/19/26. Blood Wassermann negative. Blood: 1/18/26, Hb. 70%, w.b.c. 7,300, r.b.c. 4,460,000. Basal metabolism 1/2/26, 12 plus.

X-ray showed no evidence of ulcer in stomach or duodenum. Chronic gallbladder pathology.

Pathological: There is a slight intralobular infiltration with round cells, some areas showing a little hemorrhage. The liver cells are rather pale. I do not know the cause, but some degeneration often occurs with gallbladder diseases. (Grave.)

Operation: Pylorus patulous. Adhesions were found beyond the pylorus around the duodenum, but no sign of ulcer. The middle portion of the ascending colon was restricted and held down in the upper abdomen, resulting in kinking. Small nodules through the liver resembled small stones which can be palpated and apparently moved from their location. The liver is mottled and smaller than normal. The right ovary is cystic and there is compensatory hypertrophy. The left ovary is 1½ inches in diameter, irregular, and fibrocystic. Small subserous fibroids, the size of a pea, were found on the uterus. Cholecystotomy was performed.

Progress in hospital: bile drainage for ten days. Patient vomited for five days after operation.

Interesting points in this case are:

1. Some symptoms of diseased thyroid; basal metabolism plus 12.
2. Definite symptoms of gallbladder disease before operation.
3. The lack of pronounced pathology of the gallbladder.
4. Definite liver pathology.
5. Apparently returning health.

Dr. H. L. Ulrich reported two cases of eventration of the diaphragm, one of the right side and the other of the left side. X-ray plates of both cases were shown.

Upon motion the meeting adjourned.

John E. Hynes, M.D.
Secretary.

CASE REPORTS

Members are requested to report interesting and unusual cases for publication in this department. Many cases reported at hospital staff meetings and similar meetings are very instructive and worthy of publication.

INFLAMMATION FROM DUODENAL ULCER, WITH OBSTRUCTION OF THE COMMON BILE DUCT*

REPORT OF CASE

SAMUEL F. HAINES, M.D.
Rochester, Minnesota

The patient, a woman aged fifty-eight, registered at the clinic April 6, 1925. The family and early histories were unimportant. At thirty-three she had had severe pain in the upper right quadrant which had recurred at intervals for five years, when the gallbladder, with stones, and the appendix were removed at this clinic. Following this she had been in good health until ten years before her last examination, when there was mild pain in the upper right quadrant. Similar attacks had recurred twice since then. The present trouble began with slight soreness in the epigastrium four days before the patient's admission and later a sudden, severe, colicky, epigastric pain, radiating directly to the back. The pain was intermittent, occurring in five-minute spells, and was severe enough to require morphine. The following day yellowness of the skin was noted, and there was intense generalized itching. The pains continued at intervals until the day before the patient's admission. On this day there were occasional chills and the temperature on one occasion was 102°.

Examination revealed slight jaundice of the skin and sclerotics. There was slight tenderness in the right upper abdominal quadrant and the liver edge was just palpable. During seven days while the patient was in the hospital the temperature was 98 to 99° except on one occasion, when it rose to 100.5°. The urine showed a slight trace of albumin; very few hyalin and granular casts were present. Bile was definitely present. There was slight leukocytosis, the leukocyte count being 12,200. The serum bilirubin was 8.3 mg. for each 100 c.c. Fluids were forced, and 5 c.c. of calcium chlorid, 10 per cent, was administered intravenously once daily for three days. A tentative diagnosis of choledocholithiasis was made. April 13 the coagulation time by the Lee method was seven and one-half minutes. The urine no longer contained bile.

The patient was operated on April 14. Exploration revealed pancreatitis. The head of the pancreas was almost 8 by 8 by 5 cm., and contained some disintegrated fat. There was a chronic penetrating ulcer of the duodenum with many adhesions and much old inflammatory material about it. No stones were felt. The common bile duct could not be isolated from the mass of adhesions. After suturing over the ulcerated area, which was situated on the anterior wall of the duodenum just below the pylorus, posterior gastro-enterostomy was performed.

Two days after operation (April 16) the serum bilirubin had fallen to 1.97 mg., and on April 22 to 0.85 mg. The patient made an uneventful recovery and was relieved of her trouble.

Penetrating ulcer of the duodenum is frequently given as one of the causes of obstruction of the common duct resulting in jaundice, but the condition seen here is not often encountered. In this case it is impossible to say how much the ulcer had to do with the obstruction of the common duct, as the head of the pancreas was considerably enlarged. It is possible that the ulcer and pancreatitis existed independently; on the other hand it is also possible that the enlargement of the head of the pancreas was secondary to the inflammation in the duodenum, produced by the ulcer.

Two days after the gastro-enterostomy the serum bilirubin had dropped from 8.3 to 1.97 mg. While this would suggest that the inflammatory reaction causing the obstruction of the common duct had subsided very rapidly and would seem to be evidence that the obstruction was the result of the ulcer, it would be interesting to follow this case. If there should be no return of the trouble it would certainly appear that the ulcer in the duodenum had been the cause of the whole difficulty.

*From the Division of Medicine, Mayo Clinic.

MUCOCELE OF THE APPENDIX

REPORT OF CASE

FREDERICK CHRISTOPHER, M.D., F.A.C.S.
Winnetka, Illinois

Cystic dilatation of the appendix is a relatively rare condition. Since it was first described by Virchow in 1863, some one hundred and sixty cases of various types have been reported in the literature. Its occurrence is dependent upon a slow stenosis of some part of the lumen of the appendix, and the appendiceal mucosa which secretes rapidly. In some cases there is such change in the mucosa that the normal secretion becomes colloidal pseudomucus, and in some probable sterility of the lumen distal to the stenosis. It is believed by some that a low grade inflammatory process participates in the etiology. The condition is generally acquired, but may be congenital. The mucocele may become as large as a man's head and the contents may be serous, turbid, blood-tinged, mucoid, gelatinous or pseudo-myxomatous. In the "fish egg" type, balls of inspissated mucoid material float in the fluid contents of the mucocele.

Certain types of mucocele of the appendix are considered to be potentially a malignant disease, because rupture of the cystic mucocele may cause a reactionary peritonitis of a progressive character known as pseudo-myxoma peritonei. These "metastases" do not occur unless the cyst ruptures and the contents become implanted upon the surface of the peritoneum. Here the contents (Boyd) causes "a proliferation with formation of large masses like frogs' spawn. The condition is probably due to the implantation of the

epithelial cells on the peritoneal surface, where they continue to produce their mucinous secretion. The progress of this disease is unfavorable, but removal of the appendix may check it." The only cause of pseudo-myxomatous peritonitis in the male is mucocele of the appendix. In the female, it may be caused either by a mucocele of the appendix or a cyst of the ovary.

The symptoms of pain and tenderness in the right lower quadrant have been present as long as three years before operation. Occasionally, a mass may be felt on examination. The differential diagnosis requires the consideration of ovarian cyst, hydrosalpinx, pyosalpinx, malignancy of the intestine, mesenteric cysts, intussusception, hydronephrosis, retroperitoneal cysts, renal cyst, perinephritic abscess, movable or tuberculous kidney, uterine fibroid, diverticulum of the cecum.

The following is the report of a case:

Ethel H. Age 18. At 6 P. M. on the day previous to admission, the patient became conscious of a dull aching pain in the center of the abdomen below the umbilicus. At 9 P. M. the patient became nauseated. This persisted, but there was no vomiting. The pain was severe enough to keep patient awake. The patient said that she has had many attacks similar to the present one. The last previous attack was in November, 1925, when she was confined to bed for five days. Past history negative. The physical examination was negative save for a moderate amount of tenderness in the right lower quadrant in the region of McBurney's point. There was little if any rigidity. The temperature was normal, the urine was normal.

The patient was admitted to the Evanston Hospital on January 2, 1926, for observation. Three successive leukocyte counts in twenty-four hours were 9,800, 10,200, 10,400. Operation was performed on January 4, 1926. The abdomen was opened by McBurney's incision. The appendix was found to be greatly distended and firmly adherent to the cecum. Its adhesions were made up of dark red fibrous material. The appendix was cautiously freed and removed with inversion of the stump, which was of normal diameter. The patient made an uneventful and rapid convalescence and was discharged from the hospital January 13, 1926.

Pathological Report (Dr. J. L. Williams): A markedly edematous and swollen appendix 6.2 x 1.6 cm. in the maximum. The serosa is hyperemic, hemorrhagic, and torn in some places, as its fibrous adhesions had been attached. The lumen is markedly distended with clear mucus except in the distal portion, where there is a little muco-purulent material. At the proximal end the lumen is obstructed as if from scar tissue and also 1.5 cm. from the distal end, where it is practically occluded. Microscopic: Sections of this appendix disclose a marked increase of the fibrous tissue of the wall with extensive lymphocytic invasion. In some sections there is extensive leukocytic infiltration and many polymorphonuclear eosinophiles. The serosa of the latter portions contains a considerable amount of exudate in places. The lumen of the distal portion is completely obliterated and replaced by extensive fibrous tissue with many lymphocytes. Diagnosis: Chronic appendicitis with acute exacerbation.

I. BIBLIOGRAPHY

1. Myers, W. H.: Ill. Med. Jour., May, 1925, 336.
2. Boyd, William: Surgical Pathology. Saunders, 1925, 333.
3. Collins, C. V.: Ill. Med. Jour., 1924, 16, 221.
4. Davison, Marshall: Internat. Clin., 1922, 2.
5. Bailey, P. W. Surg., Gyn. and Obst., 1916, 23:219.

II. ADDITIONAL RECENT BIBLIOGRAPHY

Blandini, N.: Un caso di appendicocele strozzato. Policlin., Roma, 1923, 30, 1590.

Chevrier, L.: Sur un case d'appendicite kystique diverticulaire. Bull. et mem. Soc. de chir. de Par., 1917, 43, 789.

Cobbett, L., and Keilin, D.: Mucoid casts from vermiform appendix. Jour. Path. and Bacteriol., 1923, 26, 297.

Flecker, M.: Retentionscyste des Proc. vermiformis. Zentralbl. f. Gynak., Leipz., 1918, 42, 307.

Fleischer: Bericht uber einen eigenartigen Zufallsbefund (Pseudomyxom der Appendix). Monatschr. f. Geburtsh. u. Gynaek., Berlin, 1923, 43, 155.

Fulle, C.: Cisti dell'appendice vermiforme. Riv. di chir., Como, 1922, 1, 110.

Ferg, E. J., and Chestnut, W. A.: A case of acute obstruction due to cystic dilatation of the appendix (hydrops of appendix). Can. Med. Assn. Jour., 1922, 12, 108.

Lemanski, W., and Jaubert de Beaujeu, A.: Un cas de retention appendiculaire prolongee. Bull. et mem. Soc. radiol. med. de France, Par., 1923, 11, 126.

Lohr, W.: Zur Frage des Wurmforsatzdivertikels und seiner Folgezustande, insbesondere des Pseudomyxoma peritonei. Deutsche Ztschr. f. Chir., Leipz., 1922, 171, 30.

Mazzini, O. F.: Pseudomyxoma of appendicular origin. Rev. Asoc. med. argent., Buenos Aires, 1922, 70, 492.

Megevand, E. C.: Giant appendix packed with colloid grains (myxoglobulosis). Rev. med. de la Suisse Rom., Geneve, 1925, 45, 525.

Michaelsson, E.: Peritoneal pseudomyoma originating in appendix. Acta chir. Scandinav., Stockholm, 1921, 53, 441.

Milliken, G., and Poindexter, C. A.: Mucocele of appendix with globoid body formation. Am. Jour. Path., 1925, 1, 397.

Morlot, R., and Mathieu, C.: Mucocele geant de l'appendice cæcal. Bull. et mem. Soc. anat. de Par., 1923, 113, 333.

Muller, G.: Pseudomucinous ovarian cyst combined with gelatinous degeneration of the vermiform appendix. Contribution to the so-called pseudomyzoma peritonei and to possible malignancy of the pseudomucinous cyst. Bratisl. lek. listy, Praha, 1923-24, 3, 152, 3 pl.

Oudard and Lancelin: Un cas d'appendicite kystique. Bull. et mem. Soc. chir. de Par., 1922, 48, 1199.

Porter, H. K.: Mucocele of appendix. Med. Jour. Australia, Sydney, 1924, 2, 252 (illus.).

Richter, H.: Schleimretention im distalen Abschnitt des proximal obliterierten Wurmfortsatzes mit Durch-

bruch in die freie Bauchhohle. Centralbl. f. allg. Path. u. path. Anat., Jena, 1924-25, 35, 362.

RIFF, A.: Sur la presence d'Amœba coli dans un kyste de l'appendice et sur son role possible dans l'etiologie de ce kyste. Compt. rend. Soc. de biol., Par., 1920, 83, 238.

ROSATI, B.: Contributo alla conoscenza del pseudomyxoma di origine appendiculare. Ann. ital. di chir., Napoli, 1922, 1, 704.

SENCERT, L., MASSON, P., and ALLENBACH, E.: Mucocele geant de l'appendice. Gaz. med. de Strasb., 1922, 80, 208.

SIMON, S.: Mucocele of appendix. Deutsche Ztschr. f. Chir., Leipz., 1924, 186, 1.

STEINSLEGER, M.: Pseudo-myxoma de origen apendicular. Rev. med. del Rosario, 1922, 12, 279.

FIBROMA OF THE OVARY

REPORT OF CASE

H. M. N. WYNNE, M.D.
Minneapolis

R. G., age 29, white, female, married, never pregnant.

Two hours after arising on the morning of Aug. 25, 1925, the patient felt a sudden pain "like a strain" in the lower left side of the abdomen. This pain grew progressively worse during the day and she had some nausea but no vomiting. There were no other symptoms.

In 1917 the appendix and two-thirds of each ovary (said to be large cystic ovaries) had been removed and the uterus suspended. I had examined this patient very satisfactorily several times and never felt any enlargement of either ovary before the present illness. The last examination was made two years ago.

Menstruation began at eleven years, occurred regularly every twenty-eight days, lasted one to three days, and was unaccompanied by pain until after the operation in 1917.

Examination in August, 1925, revealed a normal pulse and temperature. The abdomen was normal except for a little tenderness over the left lower quadrant near the ilium. Immediately behind the uterus there was a tender, firm, rounded tumor about the size of a tennis ball. The uterus was apparently normal in size, shape and consistency, but the posterior surface could not be felt. By careful manipulations the tumor was lifted up out of the cul-de-sac and the patient had immediate relief.

While under observation the following two months the tumor apparently decreased somewhat in size, but was always felt behind the uterus at each examination. She had no further attacks of pain.

A definite diagnosis was not made. The tumor was thought to be either a solid tumor of the left ovary or a pedunculated myoma attached to the posterior of the body of the uterus. The *x*-ray did not show the tumor, but a pressure defect at the junction of the rectum and sigmoid was seen.

At operation, on October 29, a fibroid tumor of the right ovary and seven small uterine myomata were removed. The pedicle was not twisted. There was no free fluid in the abdomen. The tumor was almost spherical and measured 5 cm. in diameter. Microscopic examination was made by Dr. J. S. McCartney, Jr., who found a pure fibroid of the ovary.

DISCUSSION

The growth of the tumor to its present size was made in two years or less. The tumor may have originated in the scar following the operation for resection of the cysts. There was no free fluid in the peritoneal cavity. The pain complained of was in the left pelvis while the tumor was found in the right ovary. The pain was probably due to the incarceration of the tumor in the cul-de-sac. There may have been some edema of the tumor while it was incarcerated in the cul-de-sac, which would account for the apparent decrease in size after it was lifted up in the pelvis.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

SUPERVISORS:
F. J. HIRSCHBOECK,
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THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

THE TENSION THEORY OF PLEURITIC PAIN: H. A. Bray (The American Review of Tuberculosis, 1926, XIII, 14). There are two well-known theories regarding the mechanism of pleural pain. One, the more generally accepted, ascribes pleuritic pain to friction due to roughening of the pleural surfaces by inflammatory exudate. The other attributes the pain to tonic contraction of the hyperalgesic intercostal muscles. Bray in this article discusses a third: the tension theory, so termed because it attributes pleuritic pain to tension or stretching of the inflamed parietal pleura. The presence of sensory nerve end bulbs has been demonstrated in the parietal pleura, although the visceral layer is insensitive. In acute pleurisy there is usually agonizing pain on inspiration and relief on expiration. Pleurisy at the apex is less likely to be accompanied by pain than at the base. The posture of the patient in pleurisy may be interpreted as Nature's effort to relieve pain. In costal pleurisy the patient bends his body toward the affected side. This position approximates the ribs and lowers the tension of the costal pleura. If a patient lies in a sagging bed on the healthy side the under ribs are separated and the ribs on the diseased side are approximated, thereby relieving tension of the diseased pleura. In certain cases of diaphragmatic pleurisy, the posture resem-

bles that of acute peritonitis. The patient lies on his back, quite still, with the knees flexed, the abdominal muscles rigid and the diaphragm partly or completely immobilized.

The adherents of the friction theory believe that cessation of pleuritic pain with the advent of an effusion is due to the elimination of friction. This now is questioned because in artificial pneumothorax pleuritic pain likewise subsides with an effusion. Here elimination of friction is obviously not a factor in the cessation of pain. The effusion denotes that the inflammation has entered the exudative stage and one may possibly attribute the cessation of pain to the consequent relief of pressure on the nerve terminals of the pleura. Moreover, in ordinary pleurisy with effusion, the fluid, by immobilizing the ribs, prevents tension of the pleura and hence contributes to the relief of pain.

A. T. Laird, M.D.

SURGERY

SUPERVISORS:
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GASTRIC RESECTION AND VARIOUS METHODS OF RE-ESTABLISHING THE CONTINUITY OF THE GASTRO-INTESTINAL TRACT: George Halperin (Int. Abstract of Surg., Feb., 1926; 42, 2, p. 87). The history of gastric resection began in 1879 with Pean, who first resected a stomach for pyloric cancer and joined the stomach and duodenum end to end. The difficult problem has always been the re-establishment of the continuity of the gastro-intestinal tract after the removal of the diseased part. The methods employed fall into four groups:

Group 1. End to end anastomosis. First attempted by Pean in 1879, then by Rydigier in 1880, both attempts unsuccessful. Billroth in 1881 was successful and the method became known as the Billroth 1. Physiologically, it is an ideal operation. Practically, it is difficult to avoid tension and to prevent leakage at the so-called "fatal suture angle," the angle resulting from the anastomosis of the two segments of different diameters. For a time the method was in disrepute, but there has been a partial return to it, owing largely to technical advances in the mobilization of the duodenum and stomach.

Sleeve resection, proposed by Riedel in 1904, has been given a wide application. Its disadvantages are late occurrence of contraction, recurrence of ulceration, and the formation of adhesions to the pancreas.

Group II. Side to end anastomosis. Introduced by Kocher in 1890. The stomach was resected and sewed up, and the end of the duodenum was implanted into the stomach posteriorly. The method was soon abandoned because of technical difficulties.

Group III. Side to side anastomosis. (Billroth II.) Proposed by Billroth in 1885 for cases requiring extensive resection. After resection both stumps are closed and a gastro-enterostomy is performed. It possesses no advantages over the Billroth I, and is technically more difficult.

Group IV. End to side anastomosis. Known in English and French literature as the Polya operation. It was first proposed by an assistant in Billroth's Clinic, von Hacker, in 1885, and first performed by Kroenlein in 1887. The method, at present, seems to have supplanted all others. The antecolic method, with a long loop, is used only in exceptional cases, for example, when there is a short mesocolon. In such cases Braun's entero-anastomosis is usually added.

The advantages of this method are (1) ease of performance, (2) security of suture line, (3) physiologically favorable conditions for emptying of the stomach, and (4) it is time saving.

H. E. Simon, M.D.

TUBERCULOSIS OF THE MAMMARY GLAND: Arthur M. Shipley and Hugh R. Spencer (Annals of Surgery, 83, 2, p. 175). A review of the literature emphasizes the infrequency of this condition, the incidence reported varying from .51 per cent to 1.7 per cent of all breast lesions. Of 180 collected cases, 120 presented no clinical evidence of tuberculosis elsewhere. The period of most frequent occurrence is between the ages of 20 and 50. The condition is practically always unilateral and is often confined to one quadrant of the breast. The axillary lymph nodes are involved in from 60 per cent to 75 per cent of the cases.

There are three main types: (1) Nodular, (2) confluent, and (3) the sclerosing type. In the first two types a more or less acute process is often noted, with redness of the skin, fluctuation, sinus formation or ulceration. In the sclerosing type the lesion is firm and irregular and the breast is apt to be distorted. This type is more common in older women and is not infrequently mistaken for malignancy. Retraction of the nipple and pig-skin appearance of the skin may be seen in any of the three types. Clinically, the diagnosis is based upon the chronicity of the lesion, with a tendency to infiltration and softening.

It is difficult to understand how, except by direct innoculation, breast tissue should be primarily involved any more than should tissue such as bone. Some are of the opinion that the majority of cases are the result of retrograde lymphatic involvement from the axilla or from some intrathoracic focus. This opinion is based upon the observation that the lymphatic involvement in a number of cases definitely precedes the mammary involvement.

H. E. Simon, M.D.

CANCER OF THE UMBILICUS SECONDARY TO CANCER OF THE CECUM: Jerome R. Head (S. G. & O., 42, 3, p. 356). The author reports the case of a woman, age 65, who had been explored two years previously and an inoperable tumor of the cecum found. One year after the operation she had noticed a small pimple at the umbilicus, which bled when it was scratched. It had increased in size, and on admission was a raised, fungating mass 6 cm. in diameter.

On admission, the patient had an intestinal obstruction for which an ileostomy was performed. Microscopic exami-

nation of the tissue removed from the umbilical tumor showed it to be a typical adeno-carcinoma.

Most of the diseases of the umbilicus hark back to the period of intra-uterine existence and its termination. Until a short time before birth it encompasses outpocketings of the gastro-intestinal and genito-urinary tracts, and it is not uncommon for these to remain patent, or for portions of them to become pinched off and persist as cell rests or cysts.

It also remains as a route of communication between the venous and the lymphatic systems of the peritoneal cavity and the body surface.

Of the 101 cases of cancer of the umbilicus found in the literature, 25 were primary. In the other cases the growths occurred secondary to the following primary sites, in order of frequency: stomach, ovary, intestines, gall-bladder, and uterus.

The usual route of extension is by way of the lymphatics. The normal lymphatic flow is away from the navel, which doubtless accounts for the rarity of secondary cancer in this site. Occasionally the involvement is by direct extension from the stomach or intestine, with the formation of a fistula.

In secondary growths the symptoms are usually those of advanced cancer at the primary site. These symptoms are occasionally absent, so that in all cases of cancer of the umbilicus a most careful search should be made for a latent visceral focus.

H. E. Simon, M.D.

PEDIATRICS

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HYPERTHYROIDISM IN CHILDREN: Robert S. Dinsmore (S. G. & O., Feb., 1926, vol. 42, 2, p. 172). The incidence of hyperthyroidism in children is probably higher than would be supposed from the comparatively small number of cases which have been reported in the literature. The author briefly reviews the cases reported in the literatur and reports 48 more, all under 14 years of age.

It is difficult to find a definite etiological factor in these cases. In the majority there has been no family history of goiter, of thyroid enlargement or of infection. Hyperthyroidism may be induced by the use of iodine, but only in a very small percentage of cases. DeQuervain believes that the risk from iodine in these cases is almost nil if the dose does not exceed 3 mgms.

The usual sequence of symptoms is nervousness followed by enlargement of the thyroid gland, with tachycardia and exophthalmos. Loss in weight is not a constant finding. The determination of the basal metabolism in children is rather unsatisfactory owing to divergence of opinion as to what may be considerd the normal rate and to the difficulties in controlling children.

The treatment of hyperthyroidism is the same whether the patients are children or adults except that it must be borne in mind that these children are very susceptible to every form of stimuli and are very poor operative risks. The same careful handling is required as in severe cases in adults.

In the presence of other foci of infection, the goiter should be removed first, as other operative procedures in the presence of severe hyperthyroidism is apt to cause a very severe reaction.

H. E. Simon, M.D.

ROENTGENOLOGY

SUPERVISORS:

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ROENTGEN RAY STUDY OF BRONCHIECTASIS: Singer and Graham (Am. Jour. Roent., Vol. 15, p. 54, Jan., 1925). Roentgenograms are made in cases suspected of bronchiectasis in the antero-posterior, postero-anterior, and horizontal positions. An analysis of the shadows seen in these films, together with the history and physical signs, will usually permit a definite diagnosis to be made. Particular attention should be given to the shadows in the cardio-phrenic angles which are often confused with the heart shadow.

Diagnostic pneumothorax, using a comparatively small amount of air, will give valuable information as to which lung is most diseased, and as to the extent of the bronchiectasis. Frequently the pneumothorax thus instituted has such a beneficial effect that it is continued for therapeutic purposes.

Postural drainage should be instituted. Its effects can best be studied by repeated roentgen examinations and the relative size of the bronchiectatic area can be determined.

The lobes affected are frequently atelectatic and this condition can be distinctly determined by *x*-ray examination before operation.

Leo G. Rigler, M.D.

FRACTIONAL ROENTGEN IRRADIATION: Morgan (Am. Jour. Roentgenol., Vol. 15:115, Feb., 1926). The use of very heavy doses of *x*-rays at one sitting has a number of objections, chief among which are the long time required which exhausts the patient and the profound deleterious effect which may be produced upon the normal tissues and the general resistance of the patient. In addition to the destruction of the abnormal cells, it is important, in giving radiation, to preserve the normal tissues which have no doubt an inhibitory power of their own against the abnormal cells.

The author has therefore changed his technic, using small doses at frequent intervals, three or four times a week. The

voltage and filtration remain the same. The portals of entry are increased greatly in size to attempt to reach any possible tumor tissue even at some distance. This type of radiation appears to be very effective especially in the inoperable cases of cancer in which the general condition of the patient is poor and radical treatment would be dangerous. Remarkable involutions of malignant growths, which previously had proved resistant to heavy radiation, are reported.

LEO G. RIGLER, M.D.

PYELITIS IN PREGNANCY: Butler (Am. Jour. Roentgenol., 15:144, Feb., 1926). A study of the urinary tract by means of the injection method—the pyelogram—is very accurate. It demonstrates the presence of pathology and the extent of the lesion. In the pyelitis of pregnancy it can be done the same time that drainage and lavage—the method of treatment—are accomplished.

A study of cases of pyelitis in pregnancy reveals that it occurs most commonly in multiparas; it may be early or late and is most frequent on the right side. The diagnosis is first made by the finding of pus and colon bacilli in the urine. The treatment consists of plenty of water, rest, and lavage; catheterization of the ureters with drainage frequently clears up the condition.

The catheterization is usually accomplished without any great difficulty, although pressure on the bladder or ureters may cause some obstruction. Sodium iodide is injected and bilateral injections are made without hesitation. The remainder of the technic is of the usual type.

The cases may be divided into: (1) dilatation of the pelvis and ureter with or without kinks; (2) blunting of the calyces in addition to dilatation; (3) real destruction of kidney substance.

All these forms are clearly manifested in the pyelograms.

LEO G. RIGLER, M.D.

EYE, EAR, NOSE AND THROAT

SUPERVISORS:

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FIDELITY BLDG., DULUTH

THE VALUE OF THE ROENTGEN RAY IN RHINOLOGIC DIAGNOSIS, WITH AN ELABORATION OF THE OBLIQUE METHOD OF RHESE: W. P. Wherry, M.D. (Archives of Otolaryngology for Jan., 1926, p. 1). The oblique position of Rhese is designed to show to the best advantage the ethmoid and sphenoid sinuses in roentgenograms. It presents the sinuses in their anteroposterior dimensions, which allows a study of the separate cells and readily identifies the structures in question. Also, because the exposure is made through tissue of lesser density than ordinarily, the tissue changes, suppurative and non-suppurative, are more easily recognized. This is especially true in stereoscopic exposures.

The oblique method requires close accuracy in the placing of the patient and timing of the exposure. The entire region is seen through the orbit. Stereoscopic roentgenograms are essential to careful diagnosis.

Technic.—Use four 8 by 10 duplitized films which are placed with double intensifying screens mounted in cassettes. Use a 5-inch spark gap with 20 milliamperes, and a distance of 33 inches for the oblique position.

The oblique position is made with the patient prone, and the chest resting on a pillow. The head is placed so that the left side rests on the superior angle of the orbit, and the prominence of the left molar bone. The tip of the nose touches the plate changer and a five-eighth-inch block of wood is placed under the chin. Stereoscopic views are taken, the position is changed and the procedure repeated on the right side. The distance is 33 inches.

Comment.—The oblique method of Rhese affords the best comparative study of the ethmoid and sphenoid sinuses of any methods tried. Other methods show the sinus isolated or overlapped by other adjacent parts, and do not convey the comparative information necessary for proper orientation.

E. L. ARMSTRONG, M.D.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

THE PHARMACOPEIA OF THE UNITED STATES OF AMERICA. 10th Decennial Revision. Prepared by the Committee of Revision and published by the Board of Trustees. Cloth, $4.00. Philadelphia: J. B. Lippincott Co., 1926.

INTERNATIONAL CLINICS. Edited by Henry W. Cattell, A.M., M.D., Philadelphia, in collaboration with others. Volume I. Thirty-sixth series, 1926. 309 pages. Illus. Philadelphia and London: J. B. Lippincott Co., 1926.

OPHTHALMIC NEURO-MYOLOGY. C. G. Savage, M.D., LL.D., former Professor of Ophthalmology in the Medical Department, Vanderbilt University, etc. 2nd edition. 227 pages. Illus. Cloth, $3.00. Published by author, Nashville, Tenn., 1926.

MEDICAL DIAGNOSIS FOR THE STUDENT AND PRACTITIONER. Charles Lyman Greene, M.D., St. Paul, Formerly Professor of Medicine and Chief of Medical Clinic, University of Minnesota, Chief of Staff, St. Luke's Hospital, St. Paul, etc., etc. 1,495 pages. 14 color plates, 709 illustrations. 6th revised edition. Cloth, $12.00. Philadelphia: P. Blakiston's Son & Company, 1926.

PEDIATRICS—THE PRACTICAL MEDICAL SERIES. Vol. IV. Edited by Isaac A. Johanna Herrmann, M.D. 381 pages. Illus. Cloth, $2.00. Chicago: The Year Book Publishers, 1925.

This is a complete review of current Pediatric Literature for the year 1924. During this period considerable attention was paid to hemorrhagic conditions of the newborn and also to immunization of individuals to scarlet fever and diphtheria.

L. R. CRITCHFIELD, M.D.

THE DEVELOPMENT OF OUR KNOWLEDGE OF TUBERCULOSIS. Lawrence F. Flick, M.D., LL.D. Philadelphia. 783 pages. Cloth, $7.50. Published by the author, 738 Pine Street, Philadelphia, 1925.

"Tuberculosis is one of the most complex and most difficult subjects in the art and science of medicine. It has been an affliction from the dawn of civilization. Now that it is understood, and its mysteries cleared up, and the way paved for its extermination, the story of how this was done is of gripping interest."

And this story loses none of its interest in the way it is told in Dr. Flick's work, which is the result of a prodigious amount of historical research and labor.

He tells us of the apostems of the ancients and that they discussed the contagiousness of tuberculosis and its entity with the pearl disease of cattle. He leads us along the paths of darkness through the middle ages with accounts of their horrible decoctions to Morton's "Phthisiologia," which was writetn in the seventeenth century. Thence he goes on step by step to Auenbrugger's discovery of Percussion, with accounts of the work of Stark, Reid and Baillie in England and Scotland, of Portal, and finally of Laennec in France. This chapter on Laennec, one of the heroes of medical history, dying at forty-six years of age from tuberculosis which probably was acquired while in the post-mortem room, is intensely interesting. The father of physical examination as practised today, he devised the stethoscope, taught the value of auscultation and revived Auenbrugger's methods of percussion—besides clearing up many pathological questions by his keen observations and clear reasoning powers. And so the story goes on to Virchow, who taught in the '60s that tuberculosis, phthisis, scrofula, and lupus were separate diseases and did not accept the identity of tuberculosis and the pearl disease of cattle, and believed tuberculosis to be inherited. At the same time Villemin was demonstrating most logically that tuberculosis was a communicable disease. Thus Koch's work is reached and all the uncertainties and wordy debates of the centuries are finally ended, a program based on scientific truths is clearly stated and the world is today demonstrating once more the truth of Pasteur's statement that it is within the power of man to banish every parasitic disease.

This is a monumental work and its study full of pleasure and instruction.

H. L. TAYLOR, M.D.

MAN: HIS MAKING AND UNMAKING. E. Boyd Barrett, M.A., Ph.D., Prof. of Psychology, Georgetown Univ., Washington, D. C. 269 pages. Cloth, $2.50. New York: Thomas Seltzer, 1925.

This work is a book of 269 pages, devoted to a simplified study of the so-called "new psychology." The author devotes himself to proving that man's unmaking is largely due to lack of self-knowledge, while man's making is founded upon a clear understanding of his own nature. He deals in a very interesting way with a general discussion of mankind, going into reactions and subconscious mental processes of the individual. Following this are interesting chapters on the mind out of tune, abnormal impulses, dromomania, kleptomania, pyromania, narcotomania, gambling, borrowing and criminal tendencies. Taking up each of these as a separate entity, he discusses them all in a simple, rational and fascinating way. It is a volume which is very interesting and useful to those who cannot satisfy themselves with mere Freudianism.

W. H. HENGSTLER, M.D.

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Counties—Blue Earth, Carver, Le Sueur, McLeod, Nicollet, Renville, Scott, Sibley.

DISTRICT NO. 5

J. F. SAVAGE, M.D. ..... Saint Paul

Counties—Chisago, Anoka, Dakota, Goodhue, Isanti, Ramsey, Rice, Washington.

DISTRICT NO. 6

W. H. CONDIT, M.D. ..... Minneapolis

Counties—Hennepin, Kandiyohi, Meeker, Sherburne, Stearns, Wright.

DISTRICT NO. 7

J. G. MILLSPAUGH, M.D. ..... Little Falls

Counties—Beltrami, Benton, Cass, Clearwater, Crow Wing, Douglas, Hubbard, Mille Lacs, Morrison, Todd, Wadena.

DISTRICT NO. 8

G. S. WATTAM, M.D. ..... Warren

Counties—Becker, Clay, Grant, Kittson, Lake of the Woods, Mahnomen, Marshall, Norman, Ottertail, Pennington, Polk, Red Lake, Roseau, Traverse, Wilkin.

DISTRICT NO. 9

W. A. COVENTRY, M.D. ..... Duluth

Counties—Aitkin, Carlton, Cook, Itasca, Kanabec, Koochiching, Lake, Pine, St. Louis.

Minnesota State Medical Association

COUNTY SOCIETY ROSTER

BLUE EARTH COUNTY MEDICAL SOCIETY

Regular meetings, last Monday in each month.
Annual meeting, last Monday in December.

President
Black, Wm.....Mankato
Secretary
Cosgriff, J. A.....Mankato

Andrews, John W.....Mankato
Andrews, Roy N.....Mankato
Arnold, James E...Vernon Center
Benham, Edward W.....Mankato
Cosgriff, J. A.....Mankato
Dahl, Gerhard A.....Mankato
Denman, Austin V.....Mankato
Edwards, Ralph T.....Elysian
Franchere, Fred W.....
.....Lake Crystal
Fugina, Geo. R.....Mankato
Hielscher, Helen H.....Mankato
Hielscher, Julian A.....Mankato
Holbrook, John S.....Mankato
Holman, Carl J.....Mankato
James, John H.....Mankato
Julian, R. O.....St. Clair
Kelly, Thos. C.....Mankato
Kemp, Alphonse F.....Mankato
Liedloff, Adolph G.....Mankato
Lloyd, Hiram J.....Mankato
Miller, Victor.....Mankato
Osborn, Lida.....Mankato
Schlesselman, J. T.....Mankato
Schmidt, P. A.....Good Thunder
Sohmer, Alphonse E. J..Mankato
Wentworth, Albert J....Mankato

BLUE EARTH VALLEY MEDICAL SOCIETY

Martin and Faribault Counties.
Regular meeting, monthly.
Annual meeting, fourth Thursday in May.

President
Cooper, M. D.....Winnebago
Secretary
Hunt, R. C.....Fairmont

Bailey, H. B.....Ceylon
Best, F. E.....Wells
Boysen, H.....Truman
Butz, J. A.....Monterey
Chambers, W. C.....Blue Earth
Cooper, M. D.....Winnebago
Farrish, R. C.....Sherburn
Gough, W. H.....Granada
Henderson, A. J.....Kiester
Herman, S.....Welcome
Hunt, F. N.....Fairmont
Hunt, R. C.....Fairmont
Hunte, A. F.....Truman
Johnson, H. P.....Fairmont
Logan, F. W.....Blue Earth
Luedtke, G. H.....Fairmont
McGroarty, J. J.....Easton
Mills, J. W.....Winnebago City
Richardson, W. J.....Fairmont
Silvernail, F.....Elmore
Sybilrud, H. W.....Bricelyn
Wilson, C. E.....Blue Earth

CAMP RELEASE DISTRICT MEDICAL SOCIETY

Renville, Chippewa, Lac qui Parle, Yellow Medicine and Sibley Counties.
Regular meetings, quarterly.
Annual meeting, October.

President
Smith, L. G.....Montevideo
Secretary
Holmberg, L. J.....Canby

Adams, R. C.....Bird Island
Aldrich, F. H.....Belview
Bacon, R. S.....Montevideo
Barfield, J. J.....Granite Falls
Brand, W. A.....Redwood Falls
Burns, M. A.....Milan
Bushey, M. E.....Arlington
Clay, E. M.....Renville
Cole, H. B.....Redwood Falls
Cress, E. E.....Boyd
Engelhart, P. C.....Wood Lake
Farrell, J. C.....Arlington
Flinn, B. P.....Redwood Falls
Flinn, T. E.....Redwood Falls
Flower, W. Z.....Minneapolis
Gaines, E. C.....Buffalo Lake
Hauge, M. M.....Clarkfield
Holmberg, L. J.....Canby
Johnson, C. M.....Dawson
Johnson, H. M.....Dawson
Kaufman, A. J.....Franklin
Kilbride, J. S.....Canby
Mee, P. H.....Osseo
Mitchell, A. B.....Hector
Passer, A. A.....Olivia
Penhall, F. W.....Morton
Puffer, F. L.....Bird Island
Sanderson, A. G....Granite Falls
Stemsrud, A. A.....Dawson
Walker, G. H.....Austria
Zimbeck, R. D.....Maynard

CENTRAL MINNESOTA DISTRICT MEDICAL SOCIETY

Mille Lacs, Sherburne, Isanti, Anoka and Kanabec Counties
Regular meeting, November.
Annual meeting, June.

President
Swenson, Charles.....Braham
Secretary
Cooney, H. C.....Princeton

Bossert, C. S.....Mora
Caley, G. R.....Princeton
Cooney, H. C.....Princeton
Gates, C. E.....Anoka
Hall, E. L.....Princeton
Hendenstrom, L. H...Cambridge
Norrgard, H. T.....Milaca
Peterson, A. A.....Mora
Roadman, I. M.....Ponsford
Roehlke, A. B.....Elk River
Shulean, N. S.....Cambridge
Spurzem, R. J.....Anoka
Stocking, F. F.....Milaca
Swennes, O. S.....Wahkon
Swenson Charles.....Braham
Vick, M.....Onamia
Vrooman, F. E.....St. Francis

CHISAGO-PINE COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday in January, May, August and November.
Annual meeting, second Tuesday in May.

President
Dredge, H. P.....Sandstone
Secretary
Kelsey, C. G.....Hinckley
Bohling, B. S.....Sandstone
Callahan, F. F.....Pokegama
Dredge, H. P.....Sandstone
Flom, A. O.....Chisago City
Gunz, A. W.....Center City
Holmes, A. E.....Rush City
Kelsey, C. G.....Hinckley
Paulson, C. W.....North Branch
Stephan, E. L.....Hinckley
Stewart, R. I.....Lindstrom
Stowe, A. J.....Rush City
Stratte, A. K.....Pine City
Tilton, A. J.....Alden
Wiseman, Robert L.....Pine City

CLAY-BECKER COUNTY MEDICAL SOCIETY

Regular meetings, second Thursday, January, April, July and October.
Annual meeting, October.

President
Humphrey, E. W.....Moorhead
Secretary
Heimark, J. H.....Moorhead
Archibald, F. M.....Mahnomen
Bergheim, M. C.....Hawley
Griffin, P. J.....Gary
Hagen, O. J.....Moorhead
Haight, G. G.....Audubon
Heimark, Jacob H.....Moorhead
Humphrey, E. W.....Moorhead
Larson, O. O.....Detroit
Bardee, Katherine .....
.....Northampton, Mass.
Rutledge, L. H.....Detroit
Simison, C. W.....Hawley
Thornby, H. J.....Moorhead
Thysell, F. A.....Moorhead

DODGE COUNTY MEDICAL SOCIETY

Regular meetings, third Wednesday in January, May and September.
Annual meeting, third Wednesday in September.

President
Smith, F. D.....Kasson
Secretary
Bigelow, C. E.....Dodge Center

Adams, Rollin T.....Mantorville
Belt, Wallace E....Dodge Center
Bigelow, Chas. E...Dodge Center
Clifford, Frank F..West Concord
Smith, Frank D.....Kasson
Way, Osman F.....Claremont

FREEBORN COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.
Annual meeting, December.

President
Von Berg, J. P.....Albert Lea
Secretary
Gamble, J. W.....Albert Lea

Branham, D. S.....Albert Lea
Burns, H. D.....Albert Lea

Buttruff, C. R.....Freeborn
Calhoun, F. W.....Albert Lea
Folken, F. G.....Albert Lea
Freeman, J. P.....Glenville
Gamble, J. W.....Albert Lea
Gamble, P. M.....Albert Lea
Gullixson, A.....Albert Lea
Kamp, B. A.....Albert Lea
Kooiker, H. J.....Albert Lea
Nannestad, J. R.....Albert Lea
Palmer, C. F.....Albert Lea
Palmer, W. L.....Albert Lea
Schultz, J. A.....Albert Lea
Vollum, E. O.....Albert Lea
Von Berg, J. P.....Albert Lea

GOODHUE COUNTY MEDICAL SOCIETY

Annual meeting, first Tuesday in January.

President
Werner, N. L.....Red Wing
Secretary
Smith, M. W.....Red Wing

Aanes, A. M.....Red Wing
Anderson, J. V.....Red Wing

Anderson, S. H.....Red Wing
Backe, Edmund.....Kenyon
Bjorgo, C. W.....Cannon Falls
Claydon, L. E.....Red Wing
Conley, Alva.....Cannon Falls
Cremer, M. H.....Red Wing
Cremer, P. H.....Hastings
Gausemel, S. D.....Goodhue
Johnson, A. E.....Red Wing
Jones, A. W.....Red Wing
McGuigan, H. T.....Red Wing
Sawyer, H. P.....Goodhue
Smith, M. W.....Red Wing
Steffens, L. A.....Red Wing
Werner, N. L.....Red Wing

HENNEPIN COUNTY MEDICAL SOCIETY

Regular meetings, first Monday of each month, except July and August.
Annual meeting, first Monday in January.

President
Erb, Frederick A....Minneapolis
Secretary
LaVake, R. T.....Minneapolis

Abbott, A. W.....Minneapolis
Adair, Fred L.....Minneapolis
Ahrens, R. S.....Minneapolis
Allen, H. W.....Minneapolis
Allison, R. G.....Minneapolis
Almquist, H. E.....Minneapolis
Andersen, Arnt G....Minneapolis
Anderson, A. E.....Minneapolis
Anderson, David D...Minneapolis
Anderson, Ed. Dyer..Minneapolis
Anderson, Frank J...Minneapolis
Anderson, James K....Crookston
Annis, H. B.....Minneapolis
Arey, H. C.....Excelsior
Arvidson, C. G.....Minneapolis
Aune, Martin.....Minneapolis
Aurand, W. H.....Minneapolis
Avery, J. Fowler....Minneapolis
Aylmer, A. L.....Minneapolis
Baken, Melvin P.....Minneapolis
Baker, Alfred T.....Minneapolis
Baker, E. L.....Minneapolis
Baker, Looe .....Minneapolis
Bakke, O. H.....Minneapolis
Baldwin, L. B.....Minneapolis
Barron, Moses.....Minneapolis
Bass, G. Willis.....Minneapolis
Baxter, Stephen H...Minneapolis
Beard, Archie.....Minneapolis
Bedford, Edgar W...Minneapolis
Bell, J. W., Sr.....Minneapolis
Benedict, E. E.....Minneapolis
Benjamin, A. E.....Minneapolis
Benn, F. G.....Minneapolis
Benson, Ross D.....Minneapolis
Bessesen, A. N., Sr...Minneapolis
Bessesen, A. N., Jr...Minneapolis
Bessesen, Dan H.....Minneapolis
Bessesen, Wm. A.....Minneapolis
Bissell, F. S.....Minneapolis
Blake, James.....Hopkins
Blanton, Smiley .....Minneapolis
Blaustone, H. H.....Minneapolis
Blumenthal, Jacob S. Minneapolis
Bockman, M. W. H...Minneapolis
Booth, A. E.....Minneapolis
Boquist, E. T. W.....Minneapolis
Boreen, C. A.....Minneapolis
Bouman, H. A. H....Minneapolis
Boynton, Ruth E.....Minneapolis
Bracken, H. M.....Minneapolis
Bratrud, Arthur F...Minneapolis
Brooks, Chas. N.....Minneapolis
Brown, E. J.....Minneapolis
Brown, Edgar D.....Minneapolis

Brown, R. S.....Minneapolis
Bryant, Oliver R.....Minneapolis
Butler, John.....Minneapolis
Byrnes, W. J.....Minneapolis
Cabot, V. S.....Minneapolis
Cady, L. H.....Minneapolis
Camp, Walter E.....Minneapolis
Campbell, Lowell M..Minneapolis
Campbell, Robert A..Minneapolis
Carey, James B.....Minneapolis
Carlaw, C. M.....Minneapolis
Cheleen, S. J.....Minneapolis
Cherry, Chas. H.....Minneapolis
Cirkler, A. A.....Minneapolis
Clark, Howard S.....Minneapolis
Condit, W. H.....Minneapolis
Cook, H. W.....Minneapolis
Cooperman, H. O....Minneapolis
Corbett, J. Frank....Minneapolis
Cosman, E. O.....Minneapolis
Crafts, L. M.....Minneapolis
Cranmer, Richard R..Minneapolis
Creighton, Ralph H..Minneapolis
Cross, J. G.....Minneapolis
Crume, Geo. P.....Minneapolis
Curtin, John F.....Minneapolis
Cutts, George.....Minneapolis
Dady, Elmer E.....Minneapolis
Dahl, Elmer O.....Minneapolis
Dahl, John A.....Minneapolis
Daniel, Donald H....Minneapolis
Daniel, Lewis M.....Minneapolis
Dart, L. O.....Minneapolis
Devereaux, T. G.....Wayzata
Dezell, Earl R.....Minneapolis
Deziel, G.....Minneapolis
Diehl, Harold .....Minneapolis
Diessner, H. D.....Minneapolis
Disen, C. F.....Minneapolis
Doctor, Wm. R.....Minneapolis
Donaldson, C. A.....Minneapolis
Dorge, Richard.....Minneapolis
Doxey, G. L.....Minneapolis
Drake, Chas. R.....Minneapolis
Dreisbach, Norman ..Minneapolis
Dumas, Alexander...Minneapolis
Dunlap, E. H.....Minneapolis
Dunn, Geo. Robert..Minneapolis
Dunn, Louis.....Minneapolis
Dunsmoor, F. A.....Minneapolis
Egilsrud, Kristian...Minneapolis
Ehrenberg, C. J.....Minneapolis
Eisler, Edwin R....Minneapolis
Eitel, George G.....Minneapolis
Eitel, George D.....Minneapolis
Ellison, David E.....Minneapolis
Erb, Fred A.....Minneapolis
Ericson, John G.....Minneapolis
Everlof, J. L.....Minneapolis
Fansler, W. A.....Minneapolis
Farr, R. E.....Minneapolis
Feidt, W. W.....Minneapolis
Fink, Walter H.....Minneapolis
Fischer, G.....Minneapolis
Fjelstad, C. Alford..Minneapolis
Fjellman, R. C.....Minneapolis
Fleming, A. S.....Minneapolis
Flocken, Chas. F....Minneapolis
Fowler, L. Haynes...Minneapolis
Franzen, H. G.....Minneapolis
Friedell, A.....Minneapolis
Gammell, J. H.....Minneapolis
Gardner, Edwin L..Minneapolis
Geist, Emil S.....Minneapolis
Giessler, Paul W....Minneapolis
Gilles, F. L.....Minneapolis
Goldberg, Isadore M. Minneapolis
Gordon, George J....Minneapolis
Gosin, D. F.....Minneapolis
Grave, Floyd .....Minneapolis
Greisheimer, Esther M.....
.....Minneapolis
Green, E. K.....Minneapolis
Greene, W. P.....Minneapolis
Gunderson, Harley J..Minneapolis
Gunderson, Nels A...Minneapolis
Hacking, Frank .....Minneapolis
Hagen, G. L.....Minneapolis
Haggard, Geo. D.....Minneapolis
Hall, J. M.....Minneapolis
Hamel, Arnold L.....Minneapolis
Hamilton, Arthur S..Minneapolis
Hamlin, George B....Minneapolis
Hammond, A. J.....Minneapolis
Hansen, Elmer H....Minneapolis
Hansen, Erling.....Minneapolis
Hansen, Olga S.....Minneapolis
Hanson, H. J.....Minneapolis
Hanson, Henry V....Minneapolis
Hare, Earle R.....Minneapolis
Harrington, C. D....Minneapolis
Harrington, F. E....Minneapolis
Hartzell, Thos. B....Minneapolis
Haverfield, Addie R..Minneapolis
Hayes, J. M.....Minneapolis
Head, Geo. Douglas..Minneapolis
Hearn, Wm. O.....Minneapolis
Hedback, A. E.....Minneapolis
Heim, R. R.....Minneapolis
Helk, H. H.....Minneapolis
Hendrickson, J. F....Minneapolis
Henry, C. E.....Minneapolis
Henry, Myron O.....Minneapolis
Herman, Arthur L..Minneapolis
Herbst, Wm. P.....Minneapolis
Hiebert, J. P.....Minneapolis
Higbee, Paul A.....Minneapolis
Higgins, J. H.....Minneapolis
Hill, Eleanor J.....Minneapolis
Hirschfield, Adolph..Minneapolis

Hirschfield, F. R.....Minneapolis
Hoaglund, Arthur W..Minneapolis
Hobbs, C. A.....Minneapolis
Hodge, S. V.....Minneapolis
Hoiland, A. S.....Minneapolis
Holen, T.....Minneapolis
Holm, George A.....Minneapolis
Howard, Wm. H.....Minneapolis
Huenekens, E. J.....Minneapolis
Hughes, L. D.....Minneapolis
Hynes, James.....Minneapolis
Hynes, John E.....Minneapolis

Ikeda, Kano.....Minneapolis
Irvine, H. G.....Minneapolis

Jennings, Mary H....Minneapolis
Jensen, Harry.....Minneapolis
Jensen, M. J.....Minneapolis
Joannides, Minas ....Minneapolis
Johnson, A. E.....Minneapolis
Johnson, A. Elof....Minneapolis
Johnson, James A...Minneapolis
Johnson, Julius. ....Minneapolis
Johnson, Nimrod A...Minneapolis
Johnson, Reuben A..Minneapolis
Johnson, Selmer M..Minneapolis
Jones, Griffith M....Minneapolis
Jones, H. W.....Minneapolis
Jones, W. A.....Minneapolis
Josewich, Alexander.Minneapolis

Kennedy, C. C.....Minneapolis
Kennedy, Jane .....Minneapolis
Kennedy, R. R.....Minneapolis
Kimball, H. H.....Minneapolis
King, E. A.....Minneapolis
King, W. R.....Minneapolis
Kinsella, T. J.....Minneapolis
Kistler, C. M.....Minneapolis
Kittelson, Olaf .....Minneapolis
Knight, H. L.....Minneapolis
Knight, Ralph T.....Minneapolis
Knight, Ray R.....Minneapolis
Koch, John C.....Minneapolis
Kohler, George A....Minneapolis
Koller, H. M.....Minneapolis
Koller, L. R.....Minneapolis
Kremer, Walter J....Minneapolis
Kriedt, Daniel.....Minneapolis
Kucera, Wm. J.....Minneapolis
Kusske, A. L.....New Ulm

Lajoie, J. M.....Minneapolis
Lane, Laura A.....Minneapolis
Lapierre, Arthur P...Minneapolis
Lapierre, C. A.....Minneapolis
Laurent, A. A.....Minneapolis
LaVake, R. T.....Minneapolis
Law, A. A.....Minneapolis
Leavitt, H. H.....Minneapolis
Lebowske, Jos. A....Minneapolis
Lee, H. M.....Minneapolis
Leland, M. N.....Minneapolis
Lemstrom, Jarl.....Minneapolis
Leonard, L. J.....Minneapolis
Lind, C. J.....Minneapolis
Lindquist, Richard H.....
.....Minneapolis
Linner, H. P.....Minneapolis
Lippman, Hyman S..Minneapolis
List, Walter E.....Minneapolis
Litchfield, J. T.....Minneapolis
Litzenberg, J. C.....Minneapolis
Logefeil, Rudolph ...Minneapolis
Long, Jesse.....Minneapolis
Loomis, E. A.....Minneapolis
Lundgren, A. C.....Minneapolis
Lynch, M. J.....Minneapolis
Lyng, John A.....Minneapolis
Lysne, Henry.....Minneapolis

MacDonald, A. E....Minneapolis
MacDonald, Daniel A. Minneapolis
MacDonald, Irving C. Minneapolis
McCarthy, Donald ...Minneapolis
McCartney, James S. Minneapolis
McDaniel, Oriana...Minneapolis
McEachran, A. .....Minneapolis
McFarland, Arthur H.....
.....Minneapolis
McGandy, R. F.....Minneapolis
McGeary, George E..Minneapolis
McIntyre, George....Minneapolis
McKinlay, C. A.....Minneapolis
McKinney, F. S.....Minneapolis
McPheeters, H. O...Minneapolis
Mach, Frank B.....Minneapolis
Macnie, John.....Minneapolis

Maland, C. O.....Minneapolis
Mann, A. T.....Minneapolis
Marcley, W. J.....Minneapolis
Mariette, E...Oak Terrace, Minn.
Mark, D. B.....Minneapolis
Matthews, Justus....Minneapolis
Maxeiner, Stanley R. Minneapolis
May, Wayne H.....Minneapolis
Mead, Marion A.....Minneapolis
Merkert, Chas. E.....Minneapolis
Merkert, George L...Minneapolis
Meyer, E. L.....Minneapolis
Michael, J. C.....Minneapolis
Michelson, H. E.....Minneapolis
Moir, Wm. W.....Minneapolis
Monahan, R. H.....Minneapolis
Moorhead, Martha B. Minneapolis
Moren, Edward.....Minneapolis
Moriarty, Cecile R...Minneapolis
Morrison, Angus W...Minneapolis
Murphy, I. J.....Minneapolis
Murphy, Leo.....Minneapolis
Murray, Wm. R.....Minneapolis
Myers, J. A.....Minneapolis

Nathanson, M. H.....Minneapolis
Neal, J. M.....Minneapolis
Nelson, C. P.....Owatonna
Nelson, H. S.....Minneapolis
Nelson, O. E.....Minneapolis
Newhart, Horace ....Minneapolis
Nippert, L. A.....Minneapolis
Nissen, Henrik.....Minneapolis
Noonan, Dan F.....Minneapolis
Noran, A. N.....Minneapolis
Nordin, G. T.....Minneapolis
Nordland, Martin....Minneapolis
Noth, H. W.....Minneapolis

Oberg, C. M.....Minneapolis
O'Donnell, J. E.....Minneapolis
Olson, F. A.....Minneapolis
Olson, G. M.....Minneapolis
Olson, Olaf A.....Minneapolis
Olson, R. G.....Minneapolis
Owre, Oscar.....Minneapolis

Parks, A. H.....Minneapolis
Patterson, W. E.....Minneapolis
Paulsen, E. L.....Minneapolis
Pearce, N. O.....Minneapolis
Pederson, Harold....Minneapolis
Pederson, R. M.....Minneapolis
Peppard, T. A.....Minneapolis
Perry, Ralph St. J...Minneapolis
Peters, R. M.....Minneapolis
Petersen, Thorvald ..Minneapolis
Peterson, Oliver H...Minneapolis
Peterson, Willard C..Minneapolis
Pettit, C. W.....Minneapolis
Peyton, Wm. T.....Minneapolis
Phelps, Kenneth A...Minneapolis
Pineo, W. B.....Minneapolis
Platou, Erling S.....Minneapolis
Poehler, F. T.....Minneapolis
Poppe, F. H.....Minneapolis
Pratt, Fred J.....Minneapolis
Pratt, J. A.....Minneapolis
Preine, Irving A.....Minneapolis
Prim, J. A.....Minneapolis
Proshek, Chas. E....Minneapolis

Quinby, Thos. F.....Minneapolis
Quist, Henry W.....Minneapolis

Reed, C. A.....Minneapolis
Rees, Soren P.....Minneapolis
Regnier, E. A.....Minneapolis
Reynolds, J. S.....Minneapolis
Richdorf, D. F.....Minneapolis
Rigler, Leo.....Minneapolis
Rishmiller, J. H.....Minneapolis
Roan, Carl M.....Minneapolis
Robb, Edwin F.....Minneapolis
Roberts, Thos. S.....Minneapolis
Roberts, W. B.....Minneapolis
Robitshek, E. C.....Minneapolis
Rochford, W. E.....Minneapolis
Rodda, F. C.....Minneapolis
Rodgers, Chas. L....Minneapolis
Rosen, S.....Minneapolis
Rosenwald, R. M.....Minneapolis
Rowe, Paul H.....Minneapolis
Rudell, Gustave L....Minneapolis

Sawatzky, Wm. A....Minneapolis
Schaaf, Frederick K..Minneapolis
Schefcik, J. F.....Minneapolis
Scheldrup, N. H.....Minneapolis

Schlutz, F. W.....Minneapolis
Schmitt, Aaron F....Minneapolis
Schmitt, S. C.....Minneapolis
Schneider, J. P.....Minneapolis
Schussler, O. F.....Minneapolis
Schwartz, Virgil J...Minneapolis
Schwyzer, G. .....Minneapolis
Seaberg, J. A.....Minneapolis
Seashore, Gilbert ....Minneapolis
Seham, Max.....Minneapolis
Selleseth, Iver F.....Minneapolis
Shapiro, Morse J.....Minneapolis
Simons, J. H.....Minneapolis
Simpson, E. DeWitt..Minneapolis
Simpson, John D.....Minneapolis
Siperstein, D. M.....Minneapolis
Sivertsen, Andrew...Minneapolis
Sivertsen, Ivar.....Minneapolis
Slocumb, Maude S...Minneapolis
Smith, Adam M.....Minneapolis
Smith, Arthur E.....Minneapolis
Smith, Homer R.....Minneapolis
Smith, Norman M....Minneapolis
Soderlind, A. .....Minneapolis
Solhaug, S. B.....Minneapolis
Souba, Frederick J...Minneapolis
Spratt, C. N.....Minneapolis
Staples, H. L.....Minneapolis
Stevenson, Frank W. Minneapolis
Stewart, C. A.....Minneapolis
Stomel, J. .....Minneapolis
Strachauer, A. C.....Minneapolis
Strout, Eugene S....Minneapolis
Strout, G. Elmer.....Minneapolis
Stuhr, Henry C.....Minneapolis
Sundt, Mathias .....Minneapolis
Swanson, Roy E.....Minneapolis
Sweetser, H. B., Sr...Minneapolis
Sweetser, H. B., Jr...Minneapolis
Sweetser, Theodore..Minneapolis
Sweitzer, S. E.....Minneapolis
Swendseen, Carl G...Minneapolis

Taft, John O.....Minneapolis
Taft, Walter L.....Minneapolis
Tanner, Alvin C.....Minneapolis
Taylor, Rood .....Minneapolis
Tennyson, Theo.....Minneapolis
Ternstrom, O. H.....Minneapolis
Thomas, Geo. E.....Minneapolis
Thomas, George H...Minneapolis
Thomas, Gilbert.....Minneapolis
Tingdale, A. C.....Minneapolis
Towers, F. E.....Minneapolis
Trueman, Harold S...Minneapolis
Tunstead, Hugh J...Minneapolis
Turnacliff, D. D.....Minneapolis
Tyrell, C. C.....Minneapolis

Ulrich, Henry L.....Minneapolis
Undine, Clyde A.....Minneapolis

Voyer, E. O.....Minneapolis

Waldron, Carl W....Minneapolis
Wanous, E. Z.....Minneapolis
Ward, A. W.....Minneapolis
Warham, Thos. T....Minneapolis
Watson, J. A.....Minneapolis
Webb, R. C.....Minneapolis
Weisman, Sam.....Minneapolis
Welles, H. J.....Minneapolis
Wethall, A. G.....Minneapolis
Weum, T. W.....Minneapolis
Whetstone, Mary S...Minneapolis
White, S. Marx.....Minneapolis
Widen, W. F.....Minneapolis
Wiese, H. F. B.....Minneapolis
Wilcox, Archa E.....Minneapolis
Wilcox, M. Russell..Minneapolis
Willcutt, Clarence...Minneapolis
Williams, Robert....Minneapolis
Willson, Hugh S.....Minneapolis
Witham, C. A.....Minneapolis
Wittich, F. W.....Minneapolis
Wohlrabe, A. A.....Minneapolis
Wood, Douglas F....Minneapolis
Woodard, F. R.....Minneapolis
Woodworth, Elizabeth .....
.....Minneapolis
Wright, Chas. B.....Minneapolis
Wright, C. D'a.....Minneapolis
Wright, Franklin R. Minneapolis
Wynne, H. M. N.....Minneapolis

Yoerg, O. W.....Minneapolis

Zaworski, Edw. A....Minneapolis
Ziskin, Thos.....Minneapolis

HOUSTON-FILLMORE COUNTY MEDICAL SOCIETY

Regular meetings, May, August and October.
Annual meeting, October.

President
Eby, Cyrus B.....Spring Valley
Secretary
Fischer, O. F.....Houston

Anderson, Norman E...Harmony
Browning, W. E.....Caledonia
Christianson, H. W.....Wykoff
Clifton, Theo. A.....Chatfield
Davis, I. Grant.....Rushford

Drake, F. A.....Lanesboro
Eby, Cyrus B.....Spring Valley
Fischer, O. F.....Houston
Grinnell, W. B.....Preston
Helland, G. M.....Spring Grove
Helland, J. W.....Spring Grove
Kibbe, O. A.....Canton
Kierland, P. E.....Alexandria
Lannin, J. C.....Mabel
Nass, H. A.....Mabel

Nelson, M. S.....Granite Falls
Onsgard, C. K.....Halstad
Onsgard, L. K.....Houston
Rhines, D. C.....Caledonia
Sather, E. R.....Alexandria
Tierney, C. M.....Granger
Utley, J. O.....Montrose
Williams, R. V.....Rushford
Wilson, R. H.....Rushford
Woodruff, C. W.....Chatfield

KANDIYOHI-SWIFT COUNTY MEDICAL SOCIETY

Regular meetings, quarterly, as called by the President.
Annual meeting, December.

President
French, H. S.....New London
Secretary
Scofield, C. L.....Benson

Branton, A. F.....Willmar

Branton, B. J.....Willmar
Daignault, O.....Benson
Davison, P. C.....Willmar
Dowswell, W. J.....Benson
Fiksdal, M. J.....Willmar
French, H. S.....New London
Frost, E. H.....Willmar

Hodapp, J. R.....Willmar
Jacobs, John C.....Willmar
Johnson, Hans .....Kerkhoven
Kaufman, Wm.....Appleton
Little, D. W.....Appleton
Rains, John M.....Willmar
Scofield, C. L.....Benson

LYON-LINCOLN COUNTY MEDICAL SOCIETY

Regular meetings, May and July.
Annual meeting, October.

President
Ford, B. C.....Marshall
Secretary
Workman, H. M.....Tracy

Akester, Ward .....Marshall
Bossingham, O. N...Lake Benton
Chorest, J. C. R.....Marshall

Engh, Sigfred .....Cottonwood
Ford, Burton C.....Marshall
Germo, Chas.....Balaton
Gray, F. D.....Marshall
Hoidale, A. D.....Tracy
Jacquot, G. L.....Tyler
Jensen, J. C.....Hendricks
Pearson, W. T.....Russell

Persons, C. E.....Marshall
Robertson, J. B.....Cottonwood
Sanderson, E. T.....Minneota
Thordarson, Theo.....Minneota
Vadheim, A. L.....Tyler
Valentine, W. H.....Tracy
Workman, H. M.....Tracy
Workman, W. G.....Tracy

McLEOD COUNTY MEDICAL SOCIETY

Regular meetings, April and July.
Annual meeting, April.

President
Schmidt, W. R.....Glencoe
Secretary
Axilrod, D. L.....Hutchinson

Axilrod, D. L.....Hutchinson

Clair, J. B.....Winsted
Clement, J. B.....Lester Prairie
Crow, E. R.....Minneapolis
Holm, H. H.....Glencoe
Klima, W. W.....Stewart
Kohler, F. G.....Minneapolis
Langhoff, A. H.....Glencoe

Saar, W. G.....Hutchinson
Schmidt, W. R.....Glencoe
Scholpp, O. W.....Hutchinson
Sheppard, Fred .....Hutchinson
Sheppard, P. E.....Hutchinson
Trutna, Thos. J.....Silver Lake

MEEKER COUNTY MEDICAL SOCIETY

Regular meetings, quarterly, May 15, August 15, October 15.
Annual meeting, December 15.

President
Brigham, Frank.....Watkins
Secretary
Danielson, K. A.....Litchfield

Brigham, Frank.....Watkins
Cutts, G. A. C.....Litchfield
Danielson, K. A.....Litchfield
Dulude, S. .....Dassel

Lyman, F. V.....Grove City
Peterson, Alfred.....Dassel
Sturre, J. R.....Watkins
Wilmot, H. E.....Litchfield

MOWER COUNTY MEDICAL SOCIETY

Regular meetings, last Thursday of every month.
Annual meeting, last Thursday of November.

President
Lommen, P. A.....Austin
Secretary
Allen, Chas. C.....Austin

Allen, A. W.....Austin
Allen, C. C.....Austin
Baldwin, A. E.....Brownsdale
Cobb, Willis F.....Lyle

Coleman, F. B.....Lyle
Grise, W. B.....Austin
Hegge, C. A.....Austin
Hegge, O. H.....Austin
Henslin, A. E.....Le Roy
Hertel, G. E.....Austin
Leck, C. C.....Austin
Lommen, P. A.....Austin
McKenna, J. K.....Austin

Melzer, G. R.....Lyle
Mitchell, R. S.....Austin
Morrow, J. J.....Grand Meadow
Morse, M. P.....Le Roy
Robertson, Paul A.....Austin
Schottler, G. J.....Dexter
Torkelson, P. T.....Lyle
Warren, C. L.....Le Roy

NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY

Regular meetings, June, September and December.
Annual meeting, December.

President
Smith, B. F.....St. Peter
Secretary
Daniels, J. W.....St. Peter

Aitkens, H. B...Le Sueur Center
Baskett, Geo. T.....St. Peter

Baskett, Olive T.....St. Peter
Behmler, Fred W.....Appleton
Covell, W. W.....St. Peter
Daniels, J. W.....St. Peter
Dodge, F. A.....Le Sueur
Eirley, Clara G..Mt. Pleasant, Ia.
Ericson, S.....Le Sueur
Fisher, J. M.....St. Peter

Freeman, Geo. H.....St. Peter
Le Clerc, J. E.....Le Sueur
McKeon, J. O.....Montgomery
Meilicke, W. A.....Nicollet
Norris, J. F.....St. Peter
Smith, B. F.....St. Peter
Strathern, F. P.....St. Peter

OLMSTED COUNTY MEDICAL SOCIETY

Regular meetings, second Wednesday in April, June, September and December.
Annual meeting, second Wednesday in December.

President
Pollock, L. W.....Rochester

Secretary
Piper, M. C.....Rochester

Adams, S. Franklin....Rochester
Adson, Alfred W.....Rochester
Allen, Roy W.....Rochester
Allen, Wilson A.....Rochester
Amberg, Samuel.....Rochester
Anderson, C. M.....Rochester
Anderson, E. W.....Rochester
Anderson, Mark J.....Rochester
Asbury, J. T.....Rochester
Ash, Wilfrid A.....Rochester
Aurelius, J. Richards..Rochester
Balch, Franklin G.....Rochester
Balfour, Donald C.....Rochester
Barborka, C. J.....Rochester
Bargen, J. Arnold.....Rochester
Beach, Watson .....Rochester
Barnes, A. R.....Rochester
Becker, Samuel W.....Rochester
Benedict, W. L.....Rochester
Bergen, Ralph D.....Rochester
Berkman, David M.....Rochester
Bliss, John H.....Rochester
Blackford, Launcelot M.....
.....Rochester
Bonta, Maurice B.....Rochester
Boothby, Walter M.....Rochester
Borgeson, Egbert J.....Rochester
Bowing, Harry H.....Rochester
Bowles, John H.....Rochester
Braasch, W. F.....Rochester
Brading, Edward T.....Rochester
Broders, A. C.....Rochester
Brown, A. E.....Rochester
Brown, George E.....Rochester
Brown, Philip W.....Rochester
Bueerman, Winifred H.....
.....Rochester
Buie, Louis A.....Rochester
Bumpus, Hermon C.....Rochester
Burns, Arthur.....Rochester
Carman, Russell D.....Rochester
Cathcart, Edward P...Rochester
Caylor, Harold D.....Rochester
Chumley, Charles L.....Rochester
Coffey, Jay R.....Rochester
Collins, Harry R.....Rochester
Comfort, Mandred W..Rochester
Conner, Harry M.....Rochester
Constans, George M....Rochester
Counseller, Virgil S..Rochester
Craig, W. McK.....Rochester
Crane, William W., Jr..Rochester
Crenshaw, John L.....Rochester
Crewe, John E.....Rochester
Culligan, Leo C.....Rochester
Daly, Joseph .....Rochester
Davis, Austin C.....Rochester
Desjardins, Arthur U..Rochester
Dixon, Claud F.....Rochester
Dixon, Robt. .....Rochester
Dobson, Herbert V.....Rochester
Dolder, Felix C.....Eyota
Doyle, John.....Rochester
Drips, Della G.....Rochester
Dunlap, Harold F.....Rochester
Eskew, Don Carlos....Rochester
Eusterman, George B..Rochester
Evarts, Arrah.....Rochester
Faust, Louis S.....Rochester
Fawcett, C. E.....Stewartville
Figi, Frederick A.....Rochester
Finney, W. P.....Rochester
Fishback, Frederick C. Rochester
Flothow, Paul G.....Rochester
Ford, Frances A.....Rochester
Forsberg, Carl W.....Rochester
Gaarde, Fred W.....Rochester
Garvin, John D.....Rochester
Gay, James G.....Rochester
Giffin, H. Z.....Rochester
Gipner, John F.....Rochester
Goeckerman, W. H.....Rochester
Greene, Carl H.....Rochester
Greene, Earl I.....Rochester
Greenlee, Daniel P.....Rochester
Grob, Otto.....Rochester
Habein, Harold C.....Rochester
Haines, Samuel F.....Rochester
Hallberg, C. A.....Rochester
Hallenbeck, Dorr F....Rochester
Hamrick, Robert A....Rochester
Hand, John R.....Rochester
Hargis, Estes H.....Rochester
Harrington, Ethel R...Rochester
Harrington, S. W.....Rochester
Harshbarger, I. L.....Rochester
Hartman, Howard R...Rochester
Heetderks, Dewey R...Rochester
Helmholz, Henry F....Rochester
Hempstead, Bert E.....Rochester
Hench, Philip S.....Rochester
Henderson, Earl F.....Rochester
Henderson, Melvin S...Rochester
Hendricks, William A..Rochester
Heyerdale, Oscar C....Rochester
Holloway, Jackson K..Rochester
Horton, Bayard T.....Rochester
Horwitz, Alec.....Rochester
Hufford, Alvin R.....Rochester
Huffman, Lester D.....Rochester
Hunt, India.....Rochester
Hunt, Verne C.....Rochester
Jacobs, Minerd F.....Rochester
Jepson, Paul N.....Rochester
Johnson, Arthur C.....Rochester
Johnson, Henry P.....Rochester
Jones, Hugh T.....Rochester
Joyce, George T.....Rochester
Judd, Edward S.....Rochester
Keith, Norman M.....Rochester
Kennedy, Roger L. J..Rochester
Kernohan, James W...Rochester
Kilfoy, Edward J.....Rochester
Killins, Wendell A.....Rochester
Kirchner, Augustus ...Rochester
Lapp, Victor R.....Rochester
Latchford, James K...Rochester
Lemon, Willis S.....Rochester
Lillie, Harold I.....Rochester
Lillie, Walter I.....Rochester
Linton, William B.....Rochester
Lindsey, Maude L.....Rochester
Logan, A. H.....Rochester
Luden, Georgine.....Rochester
Lundy, John S.....Rochester
Lyday, Russell O.....Rochester
Magath, Thomas B....Rochester
Mahle, Arthur E.....Rochester
Marsh, Fred E.....Rochester
Masson, Duncan M.....Rochester
Masson, James C.....Rochester
Mayfield, A. L.....Rochester
Mayo, Charles H.....Rochester
Mayo, William J.....Rochester
Maytum, Charles K....Rochester
McKaig, Carle B.....Pine Island
McKeithen, A. M.....Rochester
McKnight, Roy B.....Rochester
McQuiggan, Mark R...Rochester
McVicar, Charles S....Rochester
Mentzer, Stanley H....Rochester
Meyerding, Henry W...Rochester
Moersch, Fred P.....Rochester
Moersch, Herman J....Rochester
Moore, A. B.....Rochester
Montgomery, Hamilton..Rochester
Morton, Charles B.....Rochester
Muhme, Norman B.....Rochester
Mussey, Robert D.....Rochester
Nagel, G. W.....Rochester
Nelson, M. O.....Rochester
New, Gordon B.....Rochester
Nickel, Allen A. C.....Rochester
Nixon, Samuel H.....Rochester
Ochsenhirt, Norman C..Rochester
Offutt, Susan R.....Rochester
Ohlinger, Lorin B.....Rochester
Olson, Ernest A.....Pine Island
O'Leary, Paul A.....Rochester
Omohundro, Miles P...Rochester
Parker, Bennett R.....Rochester
Parker, Harry L.....Rochester
Parker, J. William....Rochester
Parker, Stephen T.....Rochester
Pemberton, John deJ..Rochester
Piper, Monte C.....Rochester
Plankers, A. G.....Rochester
Plummer, Henry S.....Rochester
Plummer, W. A.....Rochester
Pollock, Lee W.....Rochester
Powell, Lester D.....Rochester
Prangen, Avery.....Rochester
Prickman, Louis E.....Rochester
Pugliese, Frank M.....Rochester
Randall, Lawrence M..Rochester
Reid, J. Spence.....Rochester
Rivers, A. B.....Rochester
Robertson, H. E.....Rochester
Rohwer, C. J.....Rochester
Rosenow, Edward C...Rochester
Rowntree, Leonard G..Rochester
Sager, William W.....Rochester
Sanford, Arthur H.....Rochester
Schmitt, Earl O. G.....Rochester
Schulz, Irwin.....Rochester
Shafter, Royce R.....Rochester
Shelden, Walter D.....Rochester
Shippey, Stuart H.....Rochester
Simon, Harold E.....Rochester
Sistrunk, Walter E.....Rochester
Smith, F. L.....Rochester
Smith, Newton D.....Rochester
Snell, Albert M.....Rochester
Stacy, Leda J.....Rochester
Stark, W. B.....Rochester
Stinson, John W.....Rochester
Stuhler, Louis G.....Rochester
Sutherland, C. G.....Rochester
Swan, T. S.....Rochester
Synhorst, A. P.....Rochester
Thompson, John W.....Rochester
Vinson, Porter P.....Rochester
von Lackum, W. H....Rochester
Wagener, Henry P.....Rochester
Walters, Waltman.....Rochester
Webber, I. M.....Rochester
Weir, James F.....Rochester
Whitten, Merritt B....Rochester
Wilder, Russell M.....Rochester
Williamson, C. S.....Rochester
Wilkinson, H. F.....Rochester
Willius, F. A.....Rochester
Wilson, Louis B.....Rochester
Woltman, Henry W....Rochester
Yoakem, Howard H....Rochester

PARK REGION DISTRICT MEDICAL SOCIETY

Ottertail, Douglas, Grant and Wilkin Counties.
Regular meetings, second Wednesday in January, April, July and October.
Annual meeting, second Wednesday in October.

President
Cowing, P. G.....Evansville

Secretary
Satersmoen, Theo..Pelican Rapids

Baker, A. C.....Fergus Falls
Boysen, P.....Pelican Rapids
Brabec, F. J.....Perham
Broker, W. S.....Battle Lake
Burnap, W. L.....Fergus Falls
Cowing, P. G.....Evansville
Drought, W. W.....Fergus Falls
Esser, John .....Perham
Estrem, C. O.....Fergus Falls
Freeborn, J. A.....Fergus Falls
Goodson, Catherine M.....
.....Retreat, Pa.
Hand, W. R.....Elbow Lake
Haugen, G. T.....Fergus Falls
Kittelson, Theo. N..Fergus Falls
Lee, W. A.....Fergus Falls
Lewis, A. J.....Henning
Liebold, H. H....Parkers Prairie
Love, Fred A.....Carlos
Meckstroth, C. N.....Brandon
Naegeli, Frank.....Fergus Falls
Nelson, O. N.....Battle Lake
Otto, H. C.....Frazee
Parson, L. R.....Elbow Lake
Patterson, W. L....Fergus Falls
Paulson, Theo. S....Fergus Falls
Powers, F. W.....Barrett
Reeve, E. T.....Elbow Lake
Sargeant, H. L.....Fergus Falls
Satersmoen, Theo..Pelican Rapids
Sherping, O. Th.....Fergus Falls
Tanquist, E.....Alexandria
Vail, J. B.....Henning
Vigen, J. G.....Fergus Falls
Wray, W. E.....Campbell

RAMSEY COUNTY MEDICAL SOCIETY

Regular meetings, last Monday of each month except June, July and August.
Annual meeting last Monday in January.

President
Chatterton, C. C.....St. Paul

Secretary
Schulze, A. G.....St. Paul

Abbott, J. S.....St. Paul
Abramovich, J. H.....St. Paul
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Alberts, Max W.....St. Paul
Alden, J. F.....St. Paul
Aldes, Harry.....St. Paul
Alexander, F. H.....St. Paul
Allen, Mason.....St. Paul
Anderson, W. T.....St. Paul
Armstrong, J. M.....St. Paul
Arnquist, A. S.....St. Paul
Arouni, Khalil.....St. Paul
Arzi, C. P.....St. Paul
Bacon, Donald K.....St. Paul
Bacon, L. C.....St. Paul
Balcome, F. E.....St. Paul
Ball, C. R.....St. Paul
Barry, L. W.....St. Paul
Barsness, Nellie.....St. Paul
Beadie, W. D.....Cannon Falls
Beals, Hugh.....St. Paul
Bell, C. C.....St. Paul
Benepe, L. M.....St. Paul
Bennion, P. H.....St. Paul
Bentley, Norman P.....St. Paul
Berrisford, Paul D.....St. Paul
Binger, H. E.....St. Paul
Birnberg, T. L.....St. Paul
Bock, R. A.....St. Paul
Boeckmann, Eduard ....St. Paul
Boeckmann, Egil.....St. Paul
Bohland, E. H.....St. Paul
Bole, R. S.....St. Paul
Bolstad, H. C.....St. Paul
Borg, Joseph F.....St. Paul
Bouma, L. R.....St. Paul
Brand, G. D.....St. Paul
Bray, E. R.....St. Paul
Brimhall, J. B.....St. Paul
Brodie, Walter D.....St. Paul
Brooks, D. F.....St. Paul
Brooks, G. F.....St. Paul
Brown, Edw. I.....St. Paul
Brown, John C.....St. Paul
Burch, F. E.....St. Paul
Burfiend, G. H.....St. Paul
Burns, F. W.....St. Paul
Burns, R. M.....St. Paul
Buscher, H.....St. Paul
Caldwell, David K.....St. Paul
Caldwell, Jas. P.....St. Paul
Caldwell, Kenneth S.....St. Paul
Cameron, J. A.....St. Paul
Campbell, J. E.....S. St. Paul
Cannon, Harry.....St. Paul
Carman, Paul I.....St. Paul
Carroll, Wm. C.....St. Paul
Carter, Fred C.....St. Paul
Cavanaugh, J. O.....St. Paul
Chandler, O. B.....St. Paul
Chatterton, C. C.....St. Paul
Christiansen, A.....St. Paul
Christison, J. T.....St. Paul
Clark, T. C.....
..Soldiers Home, Minneapolis
Cobb, S. G.....St. Paul
Colby, Woodard.....St. Paul
Cole, Wallace.....St. Paul
Collie, H. G.....St. Paul
Colvin, A. R.....St. Paul
Comstock, A. E.....St. Paul
Conner, Wm. H.....St. Paul
Connor, C. E.....St. Paul
Cook, Paul B.....St. Paul
Countryman, Roger S....St. Paul
Cowern, E. W.....N. St. Paul
Critchfield, L. R.....St. Paul
Crump, J. W.....St. Paul
Culligan, John M.....St. Paul
Dack, L. G.....St. Paul
Darling, J. B.....St. Paul
Daugherty, E. B.....St. Paul
Daugherty, L. E.....St. Paul
Davis, Herbert.....St. Paul
Davis, William.....St. Paul
Dedolph, K.....St. Paul
Dickson, Thos. H., Jr....St. Paul
Dittman, Geo. C.....St. Paul
Dohm, A. J.....St. Paul
Donohue, P. F.....St. Paul
Drake, Carl B.....St. Paul
Dunn, J. N.....St. Paul
Dunne, G. P.....St. Paul
Earl, Geo. A.....St. Paul
Earl, Robert O.....St. Paul
Edlund, G.....St. Paul
Ely, O. S.....S. St. Paul
Endress, E. K.....St. Paul
Engberg, E. J.....St. Paul
Ernest, G. C.....St. Paul
Eshelby, E. C.....St. Paul
Fahey, E. W.....St. Paul
Ferguson, J. C.....St. Paul
Fesler, Harold H.....St. Paul
Flagstad, A. E.....St. Paul
Fogarty, C. W.....St. Paul
Foley, F. E. B.....St. Paul
Freeman, C. D.....St. Paul
Fulton, J. F.....St. Paul
Gager, E. C.....St. Paul
Gardiner, D. G.....St. Paul
Geer, Everett K.....St. Paul
Geissinger, John D.....St. Paul
Geist, Geo. A.....St. Paul
Ghent, Harry.....St. Paul
Ghent, M. M.....St. Paul
Giere, E. O.....St. Paul
Gilfillan, J. S.....St. Paul
Ginsberg, Wm.....St. Paul
Goltz, E. V.....St. Paul
Grant, H. W.....St. Paul
Gratzek, Thos.....St. Paul
Greene, C. L.....St. Paul
Gruenhagen, Arnold P...St. Paul
Hagaman, Geo. K.....St. Paul
Hall, A. R.....St. Paul
Halper, P. A.....St. Paul
Hammes, E. M.....St. Paul
Hammond, J. F.....St. Paul
Harmon, G. E.....St. Paul
Hauser, Victor.....St. Paul
Hawkins, V. J.....St. Paul
Heath, A. C.....St. Paul
Hengstler, W. H.....St. Paul
Hensel, C. N.....St. Paul
Hesselgrave, S. S.....St. Paul
Hilger, A. W.....St. Paul
Hilger, D. D.....St. Paul
Hilger, L. A.....St. Paul
Hochfilzer, J. J.....St. Paul
Hoff, Alfred.....St. Paul
Hoff, Peder A.....St. Paul
Hoffman, Max H.....St. Paul
Holcomb, J. T.....St. Paul
Holcomb, O. W.....St. Paul
Holl, P. M.....Minneapolis
Howard, M. A.....St. Paul
Howard, W. S.....St. Paul
Hultkrans, Joel C.....St. Paul
Hunt, H. E.....St. Paul
Ide, Arthur W.....St. Paul
Ingerson, C. A.....St. Paul
Jesion, J. W.....St. Paul
Johnson, Asa M.....St. Paul
Johnson, Hartland C....St. Paul
Johnson, Ray G.....St. Paul
Johnson, T. H.....St. Paul
Jones, D. C.....St. Paul
Jones, E. M.....St. Paul
Kamman, Gordon R.....St. Paul
Kannary, E. L.....St. Paul
Kelly, John V.....St. Paul
Kelly, Paul H.....St. Paul
Kennedy, William.....St. Paul
Kenny, H. F.....St. Paul
Kesting, Herman.....St. Paul
King, Z. P.....St. Paul
Kistler, A. S.....St. Paul
Klein, H. N.....St. Paul
Knauff, M. K.....St. Paul
Kvitrud, G.....St. Paul
Langenderfer, F. V.....St. Paul
Larsen, C. L.....St. Paul
Larson, M. L.....St. Paul
Lax, Morris H.....St. Paul
Leahy, B.....St. Paul
Leavenworth, R. O.....St. Paul
Leitch, Archibald.....St. Paul
Lepak, John A.....St. Paul
Lerche, William.....St. Paul
Lewis, J. B.....S. St. Paul
Lewis, W. W.....St. Paul
Lick, C. L.....St. Paul
Little, W. J.....St. Paul
Lowe, Earl R.....St. Paul
Lundholm, A. M.....St. Paul
McBeath, Ewing.....St. Paul
McCarthy, W. R.....St. Paul
McClanahan, J. H....White Bear
McClanahan, T. S....White Bear
McCloud, C. N.....St. Paul
McDavitt, Thomas.....St. Paul
McKeon, Owen.....St. Paul
McLaren, Jennette M....St. Paul
McNevin, C. F.....St. Paul
Maloney, T. J.....St. Paul
Martineau, J. L.....St. Paul
Meyerding, E. A.....St. Paul
Mitchell, Frederick.....St. Paul
Mogilner, S. N.....St. Paul
Molander, H. A.....St. Paul
Morris, R. Edwin.....St. Paul
Morrissey, F. B.....St. Paul
Mortenson, N. G.....St. Paul
Moskovitz, Selic.....St. Paul
Moss, Myer N.....St. Paul
Moynihan, T. J.....St. Paul
Muller, R. Theo.....St. Paul
Murphy, E. F.....St. Paul
Myers, Thos.....St. Paul
Neher, F. H.....St. Paul
Nelson, L. A.....St. Paul
Nesbit, Harold T.....St. Paul
Nichols, A. E.....St. Paul
Nippert, H. T.....St. Paul
Norr's, E. H.....St. Paul
Nye, Katherine A.....St. Paul
Nye, Lillian.....St. Paul
O'Brien, H. J.....St. Paul
O'Connor, I. A.....St. Paul
O'Connor, J. P.....St. Paul
Oerting, Harry.....St. Paul
Ogden, Warner.....St. Paul
Ohage, Justus.....St. Paul
Ohage, Justus, Jr.....St. Paul
Olson, Chas. A.....St. Paul
Ostergren, E. W.....St. Paul
Pearson, F. R.....St. Paul
Pedersen, A. H.....St. Paul
Perry, C. G.....St. Paul
Peterson, V. N.....St. Paul
Plondke, F. J.....St. Paul
Ramsey, W. R.....St. Paul
Richards, E. T. F.....St. Paul
Richardson, H. E.....St. Paul
Riggs, C. Eugene.....St. Paul
Ritchie, H. P.....St. Paul
Rogers, John T.....St. Paul
Rosenthal, Robert.....St. Paul
Rothrock, J. L.....St. Paul
Rothschild, H. J.....St. Paul
Roy, Philemon.....St. Paul
Ruhberg, Geo. N.....St. Paul
Russell, Herman.....St. Paul
Rutherford, W. C.....St. Paul
Ryan, John J.....St. Paul
Ryan, Mark E.....St. Paul
Satterlund, V. L.....St. Paul
Savage, F. J.....St. Paul
Schoch, R. B.....St. Paul
Schons, E.....St. Paul
Schuldt, F. C.....St. Paul
Schulze, Albert G.....St. Paul
Schwyzer, Arnold.....St. Paul
Senkler, G. E.....St. Paul
Shannan, W. R.....St. Paul
Shapere, A. D.....St. Paul
Shellman, John L.....St. Paul
Shillington, M. A.....St. Paul
Shimonek, Anton.....St. Paul
Simon, B. F.....St. Paul
Simon, Geo. H.....St. Paul
Skinner, H. O.....St. Paul
Snyder, Geo. W.....St. Paul
Sohlberg, Olof.....St. Paul
Sprafka, J. M.....St. Paul
Staley, J. C.....St. Paul
Sterner, E. G.....St. Paul
Sterner, O. W.....St. Paul
Stevens, F. A.....Lake Elmo
Stewart, Alexander.....St. Paul
Stierle, Adolph.....St. Paul
Stinnette, S. E.....St. Paul
Stolpestad, H. L.....St. Paul
Swanson, Edwin O.....St. Paul
Swanson, John A.....St. Paul
Sweeney, Arthur.....St. Paul
Swendson, J. J.....St. Paul
Taylor, H. L.....St. Paul
Teisberg, C. B.....St. Paul
Tiber, L. J.....St. Paul
Tregilgas, H. R.....St. Paul
Tuttle, Thos. D.....St. Paul
Van Slyke, Chas. A.....St. Paul

Von der Weyer, William..St. Paul
Waas, Chas.....St. Paul
Wald, R. H.....St. Paul
Walker, R. E.....St. Paul
Wallinga, John H.....St. Paul
Walters, B. Frank.....St. Paul
Warner, E. F.....St. Paul
Warnock, R. W.....St. Paul
Warren, E. L.....St. Paul
Warwick, Margaret.....St. Paul
Welch, M. C.....St. Paul
Wheeler, M. W.....St. Paul
Whitacre, J. C.....St. Paul
Whitcomb, Ed. H.....St. Paul
White, J. S.....St. Paul
Whitmore, F. W.....St. Paul
Whitney, A. W.....St. Paul
Williams, Clayton.....St. Paul
Winnick, J. B.....St. Paul
Wold, K. C.....St. Paul
Wolfe, H. H.....St. Paul
Wood, H. G.....St. Paul
Ylivisaker, L. S.....St. Paul
Zander, C. H.....St. Paul
Zimmerman, H. B.....St. Paul

RED RIVER VALLEY MEDICAL SOCIETY

Kittson, Marshall, Polk, Roseau, Pennington, Red Lake, Norman and Mahnomen Counties.

Regular meetings, second Tuesday in April, September and December.

Annual meeting, December.

President
Dunlop, A. H.....Crookston
Secretary
Oppegaard, M. O.....Crookston

Adkins, C. M.....Grygla
Ahlfs, J. J.....Erskine
Anderson, W. S.....Minneapolis
Bernard, B. C...Thief River Falls
Bertelson, O. L.....Crookston
Biedermann, Jacob .....Thief River Falls
Blegen, H. M.....Warren
Borreson, Baldwin.....Remer
Bowers, J. T...Thief River Falls
Bratrud, O. Edw.....Warren
Bratrud, Theo.....Warren
Brown, Lyle L.....Crookston
Daniels, W. H.....Crookston
Delmore, J. L.....Roseau
Dryden, F. M.....Crookston
Dunlop, Alex.....Crookston
Froelich, H. W..Thief River Falls
Henney, Wm. H.....McIntosh
Hodgson, H. H.....Crookston
Holmes, W. B.....Ada
Holte, Halvor.....Crookston
Kahala, Arthur.....Crookston
Kirk, G. P.....East Grand Forks
Kjelland, J. S.....East Ellsworth, Wis.
Larson, A. L.....Fertile
Docken, O. E.....Crookston
Milan, M. Geo.....Warren
Morley, G. A.....Crookston
Nelson, H. E.....Crookston
Norman, J. F.....Crookston
Ohnstad, J.....McIntosh
Oppegaard, C. L.....Crookston
Oppegaard, M. O.....Crookston
Overend, K. V.....Hallock
Risjord, J. N.....Fertile
Roy, J. A.....Red Lake Falls
Sather, Allen.....Fosston
Shaleen, A. W.....Hallock
Shedlov, A.....Gully
Shelland, J. T.....Ada
Swedenberg, A. W.....Thief River Falls
Turnbull, Robert .....Fosston
Watson, N. M.....Red Lake Falls
Wattam, G. S.....Warren
Werner, O. S.....St. Hilaire
Wiltrout, I. Geo.....Oslo

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

Regular meeting, June 15.

Annual meeting, June 15.

President
Hammermeister, Theo. F....New Ulm
Secretary
Meierding, Wm. A....Springfield

Adams, J. L.....Morgan
Dubbe, F. H.....New Ulm
Eckstein, A. W.....Comfrey
Fritsche, A.....New Ulm
Fritsche, L. A.....New Ulm
Hammermeister, Theo. F....New Ulm
Jamieson, Earl....Walnut Grove
Kiefer, M. A.....Sleepy Eye
Meierding, Wm. A....Springfield
Pederson, O. J.....Hanska
Peterson, R. A.....Vesta
Reinecke, George F.....New Ulm
Rothenburg, J. C.....Springfield
Schoch, J. L.....New Ulm
Seifert, Otto J.....New Ulm
Shrader, J. S.....Springfield
Strickler, A. F.....Sleepy Eye
Strickler, Mary.....Sleepy Eye
Strickler, O. C.....New Ulm
Vogel, Jos. H.....New Ulm
Vogtel, M. A.....Minneapolis
Weiser, Geo. B.....New Ulm
Wellcome, J. W. B....Sleepy Eye

RICE COUNTY MEDICAL SOCIETY

Regular meetings quarterly, as called.

Annual meeting, December.

President
Moses, Joseph, Jr.....Northfield
Secretary
Traeger, C. A.....Faribault

Babcock, F. M.....Northfield
Beede, Ethel.....Faribault
Davis, F. U.....Faribault
Haessly, S. B.....Faribault
Hanson, A. M.....Faribault
Huxley, F. R.....Faribault
Kanne, C. W.....Faribault
Lee, W. P.....Northfield
Lexa, F. J.....Lonsdale
McBroom, D. E.....Faribault
Mayland, M. L.....Faribault
Meyer, P. F.....Faribault
Moses, Joseph, Jr.....Northfield
Plonske, C. J.....Faribault
Robilliard, C. M.....Faribault
Robilliard, W. H.....Faribault
Rumpf, C. W.....Faribault
Rumpf, W. H.....Faribault
Smith, P. A.....Faribault
Traeger, C. A.....Faribault
Warren, F. S.....Faribault
Warren, J. W.....Faribault
Wilson, Warren.....Northfield
Wilson, W. E.....Northfield

ST. LOUIS COUNTY MEDICAL SOCIETY

Regular meetings, second Thursday of month.

Annual meeting, October.

President
Barney, L. A.....Duluth
Secretary
Lepak, F. J.....Duluth

Abbott, Wm. P.....Duluth
Adams, B. S.....Hibbing
Arminen, K. V.....Duluth
Armstrong, E. L.....Duluth
Athens, A. G.....Duluth
Ayres, G. T.....Ely
Bagley, W. R.....Duluth
Barney, L. A.....Duluth
Berdez, G. L.....Duluth
Bergquist, K. E.....Duluth
Blanco, A. J.....Duluth
Binet, H. E.....Grand Rapids
Blacklock, S. S.....Hibbing
Blakely, C. C.....Barnum
Boman, P. G.....Duluth
Boyer, S. H.....Duluth
Braden, A. J.....Duluth
Bradley, E. L.....Duluth
Bray, C. W.....Biwabik
Briggs, F. W.....Duluth
Bullen, F. W.....Hibbing
Burns, H. J.....Duluth
Burns, R. L.....Two Harbors
Carstens, C. F.....Hibbing
Chapman, T. L.....Duluth
Cheney, E. L.....Duluth
Christensen, E. P...Two Harbors
Clark, F. F.....Duluth
Clement, T. G.....Duluth
Collins, A. N.....Duluth
Collins, H. C.....Duluth
Coventry, Wm. A.....Duluth
Crowe, J. H.....Virginia
Davis, B. F.....Duluth
Davis, H. S.....Duluth
Doolittle, L. E.....Duluth
Drenning, F. C.....Duluth
Ecklund, C. T.....Hibbing
Eckman, P. F.....Duluth
Eckblad, J. W.....Duluth
Eklund, Wm. J.....Duluth
Elias, F. J.....Duluth
Empie, W. M.....Virginia
Eppard, R. M.....Cloquet
Estrem, Theo. A.....Hibbing
Ferreira, G. J.....Aurora
Fischer, Mario McC.....Duluth
Forbes, R. S.....Duluth
Fuerste, Fred.....Proctor
Gauthier, W. L.....Virginia
Gendron, J. F.....Grand Rapids
Gilbert, J. D.....Carlton
Gillespie, M. G.....Duluth
Gillespie, N. H.....Duluth
Giroux, A. A.....Duluth
Graham, David.....Duluth
Graham, R. D.....Duluth
Graham, Robt.....Duluth
Grawn, F. A.....Duluth
Greeley, L. Q.....Duluth
Grover, F. E.....Duluth
Haney, C. L.....Duluth
Hatch, W. E.....Duluth
Heimark, O. E.....Duluth
Hill, F. E.....Duluth
Hirschboeck, F. J.....Duluth
Hirschfield, M. S.....Duluth
Hovde, H.....Duluth
Jensen, T. J.....Duluth
Kean, N. D.....Coleraine
Keyes, C. R.....Duluth
King, Wm. S.....Eveleth
Klein, Harry .....Duluth

Knapp, F. N.....Duluth
Kolbry, Carl O.....Duluth
Kraft, P.....Duluth
Kuth, J. R.....Duluth
Laird, A. T.....Nopeming
Lepak, F. J.....Duluth
Lindgren, E. I.....Duluth
Litman, S. N.....Meadowlands
Lum, C. E.....Duluth
McCarty, P. D.....Babbitt
McComb, C. F.....Duluth
McCoy, Mary.....Duluth
McDonald, A. L.....Duluth
McGiffert, E. N.....Duluth
McHaffie, O. L.....Duluth
McIntyre, E. H.....Virginia
McMurtry, W. C.....Virginia
MacRae, Gordon C.....Duluth
Magie, W. H.....Duluth
Magney, F. H.....Duluth
Manley, J. R.....Duluth
Mattill, P. M.....Oak Terrace
Merriman, L. L.....Duluth
Monroe, P. B.....Soudan
Morcom, H. W.....Duluth
More, C. W.....Eveleth
Morsman, L. W.....Hibbing
Morss, C. R.....Zumbrota
Murray, D. D.....Duluth
Nelson, E. H.....Chisholm
Nicholson, M. A.....Duluth
Olson, A. E.....Duluth
Oredson, O. A.....Duluth
Paradine, D. J.....Duluth
Parker, O. W.....Ely
Payette, C. H.....Duluth
Pennie, D. F.....Duluth
Power, J. E.....Duluth
Raadquist, C. S.....Hibbing
Radtke, H. P.....Chisholm
Raiter, F. W. S.....Cloquet
Raiter, Roy F.....Cloquet
Rippert, J. A.....Duluth
Robinson, J. M.....Duluth
Rood, D. C.....Duluth
Rowe, O. W.....Duluth
Rudie, P. S.....Duluth
Ryan, W. J.....Duluth
St. Clair, G. G.....Duluth
Scherer, C. A.....Duluth
Schroeder, C. H.....Duluth
Schwartz, A. H.....Duluth
Seashore, D. E.....Duluth
Shapiro, E. Z.....Duluth
Slyfield, F. F.....Duluth
Smith, C. M.....Duluth
Smith, E. K.....Duluth
Spicer, F. W.....Duluth
Strobel, W. G.....Duluth
Stuart, A. B.....Cloquet
Sukeforth, L. A.....Duluth
Sutherland, H. N.....Ely
Taylor, A. C.....Duluth
Taylor, C. W.....Duluth
Tibbitts, M. H.....Duluth
Tilderquist, D. L.....Duluth
Tuohy, E. L.....Duluth
Turnbull, F. M.....Duluth
Urberg, S. E.....Duluth
Van de Steeg, Wm. G...Biwabik
Vercelline, C. E.....Duluth
Walker, A. E.....Duluth
Walters, F. R.....Battle Creek, Mich.
Webber, E. E.....Proctor
Weber, Manuel L.....Duluth
Webster, H. E.....Duluth
Wheeler, D. W.....Duluth
Wilkinson, Stella L.....Duluth
Winter, J. A.....Duluth
Young, Thomas O.....Duluth
Young, V. A.....Duluth
Zlatowski, Michael.....Duluth

SCOTT-CARVER MEDICAL SOCIETY

Regular meetings, first Thursday in March, June, September and December.
Annual meeting, first Thursday in December.

President
Buck, F. H.....Shakopee

Secretary
Reiter, H. W.....Shakopee

Buck, Fred H.....Shakopee

Fischer, H. P.....Shakopee
Fischer, P. M.....Shakopee
Hebeisen, M. B.....Carver
Henriksen, H. G.....Elko
Juergens, H. M.....Belle Plaine
McKeon, James.....St. Paul
Maertz, W. F.....New Prague
Moloney, G. R.....Belle Plaine
Morris, Francis J.....Prior Lake
Reiter, H. W.....Shakopee
Schneider, H. A.....Jordan
Simons, Bern H.....Chaska
Westerman, F. C....Montgomery

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

Pipestone, Rock, Murray, Nobles, Cottonwood and Jackson Counties
Regular meetings, May and November.
Annual meeting, November.

President
Doms, H. C.....Slayton

Secretary
McKeown, E. G.....Pipestone

Arnold, E. W.....Adrian
Atkins, G. L.....Jackson
Basinger, Harvey R.....Mountain Lake
Benjamin, W. G.....Pipestone
Bofenkamp, F. W.....Luverne
Bong, J. H.....Jasper
Brown, A. H.....Pipestone
Chadbourn, A. G.....Heron Lake
Cress, P. J.....Ellsworth
De Boer, Herman.....Edgerton
Ditmeier, L. M. Gerber....Jasper
Dolan, C. P.....Worthington
Doms, H. C.....Slayton
Doms, Wm.....Woodstock
Dudley, J. H.....Windom
Golden, C. M.....Tyler
Halloran, Walter.....Jackson
Hilger, J. M.....Iona
Johnson, Ellsworth.....Windom
Keeling, F. L.....Lakefield
Knudtson, H. M.....Browerville
Lowe, Thos.....Pipestone
McCrea, Jas.....Fulda
McKeown, E. G.....Pipestone
Manson, F. M.....Worthington
Metcalf, F. W.....Fulda
Mork, B. O.....Worthington
Nusbaum, W. H..Storm Lake, Ia.
Patterson, W. E.....Westbrook
Piper, Wm. A.....Mountain Lake
Richardson, W. E.....Pipestone
Rose, J. T.....Lakefield
Sherman, C. L.....Luverne
Slater, S. A.....Worthington
Smallwood, J. T.....Worthington
Sogge, L.....Windom
Stanley, C. R.....Worthington
Taylor, Wm. J.....Pipestone
Thorson, E. O.....Luverne
Tiedeman, E. J.....Adrian
Tiedeman, I. D.....Heron Lake
Tofte, Josephine.....Fisher
Waller, Jas. D.....Wilmont
Watson, F. G.....Worthington
Williams, L. A.....Slayton
Wright, C. O.....Luverne

STEARNS-BENTON COUNTY MEDICAL SOCIETY

Regular meetings, third Thursday in January, April, July and October
Annual meeting, third Thursday in April.

President
Friesleben, Wm.....Sauk Rapids

Secretary
Libert, J. N.....St. Cloud

Adams, L. P.....Sauk Rapids
Beaty, James H.....St. Cloud
Boehm, John C.....St. Cloud
Brigham, C. F.....St. Cloud
Clark, Harry B.....St. Cloud
Du Bois, Julian F...Sauk Center
Fleming, T. N.....St. Cloud
Freeman, W. L.....St. Cloud
Friesleben, Wm.....Sauk Rapids
Gelz, J. J.....St. Cloud
Goehrs, H. W.....St. Cloud
Haberman, E.....Osakis
Hemstead, Werner.....St. Cloud
Holdridge, G. A.....Foley
Jones, R. N.....Richmond
Kern, M. J.....St. Cloud
Kingsbury, E. M.....Clearwater
Kohler, D. W.....St. Joseph
Kuhlman, Aug.....Melrose
Lewis, E. J.....St. Cloud
Lewis, C. B.....St. Cloud
Libert, J. N.....St. Cloud
McDowell, J. P.....St. Cloud
McKibben, H. E.....St. Cloud
Mahwold, A.....Albany
Meyer, A. A.....Melrose
Moynihan, And. F...Sauk Center
Myre, C. R.....Paynesville
Pfaff, E. K.....Shoals, Ind.
Pilon, P. C.....Paynesville
Rathbun, A. M.....Rice
Rathbun, C. A.....St. Cloud
Rice, G. D.....St. Cloud
Richards, W. B.....St. Cloud
Richardson, Fred S.....Belgrade
Ridgeway, Alex.....Belgrade
Schatz, F. J.....St. Cloud
Sherwood, G. E.....Kimball
Stangl, Fred.....St. Cloud
Stangl, P. E.....St. Cloud
Sutton, Chas. S.....St. Cloud
Sweetman, R. H.....Sauk Center
Townsend, D.....Brooten

STEELE COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday in each month.
Annual meeting, December 9.

President
Quigley, T. C.....Owatonna

Secretary
McIntyre, J. A.....Owatonna

Andrist, J. W.....Owatonna

Ertel, E. Q.....Ellendale
Gamble, R. M.....Ellendale
Gault, C. C.....Owatonna
Hart, A. B.....Owatonna
McIntyre, J. A.....Owatonna
Melby, B.....Blooming Prairie
Peterson, C.....Owatonna
Quigley, T. C.....Owatonna
Senn, E. W.....Owatonna
Smersh, F. M.....Owatonna
Smersh, J. F.....Owatonna
Stewart, A. B.....Owatonna
Thimsen, N. C...Blooming Prairie

UPPER MISSISSIPPI MEDICAL SOCIETY

Aitkin, Crow Wing, Morrison, Cass, Todd, Wadena, Clearwater, Koochiching, Hubbard, Itasca and Beltrami Counties.

Regular meetings in June and January.

Annual meeting in January.

President
Smith, B. A.....Crosby

Secretary
Badeaux, G. I.....Brainerd

Anderson, Arnold S.....AhGwahChing
Badeaux, G. I.....Brainerd
Beise, R. A.....Brainerd
Bone, Merle.....Kelliher
Christie, G. R.....Long Prairie
Christie, Robert L..Long Prairie
Corrigan, J. E.....Spooner
Crowl, Verne C.....Bertha
Davis, Lloyd T.....Wadena
Davis, T. C.....Wadena
Forrest, C. G.....Clearbrook
Garlock, A. V.....Bemidji
Garlock, D. H.....Bemidji
Gerber, M. P.....Brainerd
Gilmore, R. F.....Bemidji
Hawkinson, L. F.....Brainerd
Healy, R. T.....Pierz
Hermanson, Peter E....Brainerd
Holman, E. E.....Pine River
Holst, C. F.....Little Falls
Holst, J. B.....Little Falls
House, Z. E.....Cass Lake
Hvoslef, Jacob .....International Falls
Johnson, O. V.....Sebeka
Kelly, B. W.....Aitkin
Kerlan, S. Z.....Aitkin
Laney, R. L.....Puposkey
Larson, L. M.....Brainerd
Miller, W. A.....New York Mills
Millspaugh, J. G.....Little Falls
McCann, D. F.....Bemidji
McHugh, R. F.....Aitkin
Nelson, Nesmuth .....Brainerd
Nordin, C. G.....St. Paul
Ortman, John Wessel.....Pierz
Osburn, B. F..International Falls
Pierce, C. H.....Wadena
Ratcliffe, J. J.....Aitkin
Roberts, L. M.....Little Falls
Reeves, C. E.....Eagle Bend
Shannon, S. S.....Crosby
Simons, Edwin J.....Swanville
Slattery, P. A.....Red Lake
Smith, B. A.....Crosby
Smith, E. H.....Bemidji
Thabes, J. A.....Brainerd
VanValkenburg, F. W.....Long Prairie
Waldie, Geo. McL.....Wabasha
Watson, John D.....Holdingford
Will, W. W.....Bertha
Williams, R. J.....Pine River

WABASHA COUNTY MEDICAL SOCIETY

Annual meeting, first Thursday after first Monday in July.

President
Fleischhauer, D. S.....Wabasha

Secretary
Wilson, W. F.....Lake City

Bayley, E. H.....Lake City
Bowers, H. E.....Lake City
Cochrane, W. J.....Lake City
Collins, J. S.....Wabasha
Dempsey, D. P.....Kellogg
Fleischhauer, D. S.....Wabasha
French, E. A.....Plainview
Radabaugh, R. C.....Hastings
Replogle, W. H.....Wabasha
Slocumb, J. A.....Plainview
Sutton, L. F.....Mazeppa
Wilson, W. F.....Lake City

WASECA COUNTY MEDICAL SOCIETY

Annual meeting, second Monday in December.

President
Miller, H. A.....Waseca

Secretary
Gallagher, B. J.....Waseca
Bergman, O. B.....Janesville
Blanchard, H. G.....Waseca
Chamberlin, W. A.....Waseca
Cory, W. M.....Waterville
Gallagher, B. J.....Waseca
Gardner, V. H.....Waseca
Hagen, H. O.....New Richland
Leopard, B. A.....New Richland
McIntire, H. M.....Waseca
Miller, H. A.....Waseca
O'Hara, J. J.....Janesville
Swartwood, F. A.....Waseca

WASHINGTON COUNTY MEDICAL SOCIETY

Regular meetings held on second Tuesday of the odd numbered months.

Annual meeting, November.

President
Stuhr, J. W.....Stillwater

Secretary
Josewski, R. J.....Stillwater

Boleyn, E. S.....Stillwater
Culver, L. G.....Stillwater
Haines, J. H.....Stillwater
Humphrey, W. R.....Stillwater
Josewski, R. J.....Stillwater
Hemingway, R. W.....Stillwater
Kalinoff, D.....Stillwater
Landeen, F. G.....Stillwater
Mingo, F. E.....Hugo
Newman, G. A.....Stillwater
Poirier, J. A.....Forest Lake
Sherman, C. H.....Bayport
Stuhr, J. W.....Stillwater
Thompson, V. C.....Marine-on-St. Croix

WATONWAN COUNTY MEDICAL SOCIETY

Regular meetings, on call.

Annual meeting, first week in December.

President
McCarthy, W. J.....Madelia

Secretary
Grimes, H. M.....Madelia
Bregel, F. L.....St. James
Grimes, H. B.....Madelia
Hagen, O. E.....Butterfield
Hefke, Hans W.....St. James
McCarthy, W. J.....Madelia
Thompson, Albert.....St. James

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

Bigstone, Traverse, Stevens and Pope Counties.

Regular meetings, June and December.

Annual meeting, December 15

President
Weir, J. D.....Beardsley

Secretary
Linde, Herman.....Cyrus

Arnson, J. M.....Graceville
Bates, B. V.....Wheaton
Bergen, Otto.....Clinton
Bolsta, Chas.....Ortonville
Caine, C. E.....Morris
Cumming, J. F.....Chokio
Eberlin, E. A.....Glenwood
Elsey, J. R.....Glenwood
Ewing, C. F.....Wheaton
Fitzgerald, E. T.....Morris
Gibbon, L. L.....Lowry
Gray, Royal C.....Graceville
Jensen, Julius.....Starbuck
Judge, Walter T.....Graceville
Karn, B. R.....Ortonville
Leland, J. T.....Herman
Leuty, Amos.....Morris
Lindberg, A. L.....Wheaton
Linde, Herman.....Cyrus
Oliver, C. I.....Graceville
O'Donnell, D. M.....Ortonville
Opheim, O. V.....Starbuck
Pierson, Claude M.....Wheaton
Ransom, L. M.....Hancock
Shelver, H. J.....Ortonville
Weir, J. D.....Beardsley

WINONA COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday in January, April, July and October.
Annual meeting, second Tuesday in January.

President
Nauth, W. W.....Winona

Secretary
Steiner, I. W.....Winona

Adler, S. W.....Winona
Baer, H. C.....St. Charles
Benoit, F. T.....Winona
Clay, F. H.....St. Charles
Heise, W. F. C.....Winona
Keyes, E. D.....Winona
Leicht, O.....Winona
Lichtenstein, H.....Winona
Lindsay, W. V.....Winona
McLaughlin, E. M.....Winona
Nauth, W. W.....Winona
Neumann, C. A.....Lewiston
Neumann, W. H.....
.....Sheboygan, Wis.
Pritchard, D. B.....Winona
Risser, E. D.....Winona
Robbins, C. P.....Winona
Rosenberry, B. P.....Winona
Schaefer, S.....Winona
Schnarrenberger, G. .....
.....Rollingstone
Scott, J. W.....St. Charles
Steiner, I. W.....Winona
Tweedy, G. J.....Winona

WRIGHT COUNTY MEDICAL SOCIETY

Regular meetings, first Tuesday after first Monday quarterly.
Annual meeting, October.

President
Ridgway, A. M.....Annandale

Secretary
Catlin, John J.....Buffalo

Catlin, John J.....Buffalo
Catlin, T. J.....Buffalo
Ellison, Frank.....Monticello
Freed, O. J. R.....Cokato
Harriman, L.....Howard Lake
Klaveness, E.....Monticello
Lee, J. L.....Watertown
Moffatt, A. G.....Howard Lake
Norris, G. H.....Annandale
Peterson, O. L.....Cokato
Phillips, A. E.....Delano
Ridgway, A. M.....Annandale
Roholt, C. L.....Waverly
Rousseau, Victor.....Maple Lake
Shrader, E. E.....Watertown
Sturges, C. J.....Buffalo
Swezey, B. F.....Buffalo
Thoresen, Th.....Brooklyn, N. Y.

ALPHABETICAL ROSTER

Aanes, A. M.....Red Wing
Abbott, A. W.....Minneapolis
Abbott, J. S.....St. Paul
Abbott, Wm. P.....Duluth
Abramovich, J. H.....St. Paul
Adair, F. L.....Minneapolis
Adams, B. S.....Hibbing
Adams, J. L.....Morgan
Adams, L. P.....Sauk Rapids
Adams, R. C.....Bird Island
Adams, Rollin T.....Mantorville
Adams, S. Franklin....Rochester
Adkins, C. M.....Grygla
Adler, Stuart Welsh....Winona
Adson, A. W.....Rochester
Ahlfs, J. A.....Bemidji
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Ahrens, R. S.....Minneapolis
Aitkins, H. B.....LeSueur Center
Akester, Ward.....Marshall
Alberts, Max W.....St. Paul
Alden, J. F.....St. Paul
Aldes, Harry.....St. Paul
Aldrich, F. H.....Belview
Alexander, F. H.....St. Paul
Allen, A. W.....Austin
Allen, Chas. C.....Austin
Allen, H. W.....Minneapolis
Allen, Mason.....St. Paul
Allen, Roy William....Rochester
Allen, W. A.....Rochester
Allison, R. G.....Minneapolis
Almquist, H. E.....Minneapolis
Amberg, Samuel.....Rochester
Anderson, A. E.....Minneapolis
Anderson, Arnold S.....
Ah Gwah Ching
Anderson, Arnt G....Minneapolis
Anderson, C. M.....Rochester
Anderson, David D...Minneapolis
Anderson, Edward Dyer.....
Minneapolis
Anderson, E. W.....Rochester
Anderson, Frank J...Minneapolis
Anderson, J. K.....Crookston
Anderson, J. V.....Red Wing
Anderson, Mark J.....Rochester
Anderson, Norman E....Harmony
Anderson, S. H.....Red Wing
Anderson, W. S.....Minneapolis
Anderson, W. T.....St. Paul
Andrews, J. W.....Mankato
Andrews, R. N.....Mankato
Andrist, J. W.....Owatonna
Annis, H. B.....Minneapolis
Archibald, Frank M....Mahnomen
Arey, H. C.....Excelsior
Arminen, K. V.....Duluth
Armstrong, E. L.....Duluth
Armstrong, J. M.....St. Paul
Arnold, E. W.....Adrian
Arnold, James E...Vernon Center
Arnquist, A. S.....St. Paul
Arnson, J. M. .....Graceville
Arouni, Khalil.....St. Paul
Arvidson, C. G.....Minneapolis
Arzt, C. P.....St. Paul
Asbury, J. T.....Rochester
Ash, Wilfrid Anthony..Rochester
Athens, A. S.....Duluth
Atkins, G. L.....Jackson
Aune, Martin.....Minneapolis
Aurand, W. H.....Minneapolis
Aurelius, J. Richards..Rochester
Avery, J. Fowler....Minneapolis
Axilrod, D. L.....Hutchinson
Aylmer, A. L.....Minneapolis
Ayres, G. T.....Ely

Babcock, F. M.....Northfield
Backe, Edmund.....Kenyon
Bacon, Donald K.....St. Paul
Bacon, L. C.....St. Paul
Bacon, R. S.....Montevideo
Badeaux, G. I.....Brainerd
Baer, H. C.....St. Charles
Bagley, W. R.....Duluth
Bailey, H. B.....Ceylon
Baken, Melvin P....Minneapolis
Baker, A. C.....Fergus Falls
Baker, Alfred T.....Minneapolis
Baker, E. L.....Minneapolis
Baker, Looe.....Minneapolis
Bakke, O. H.....Minneapolis
Balch, Franklin G.....Rochester
Balcome, F. E.....St. Paul
Baldwin, A. E.....Brownsdale
Baldwin, L. B.....Minneapolis
Balfour, D. C.....Rochester
Ball, C. R.....St. Paul
Barborka, C. J.....Rochester
Barfield, J. J.....Granite Falls
Bargen, J. Arnold.....Rochester
Barnes, A. R.....Rochester
Barney, L. A.....Duluth
Barron, Moses.....Minneapolis
Barry, L. W.....St. Paul
Barsness, Nellie.....St. Paul
Basinger, Harvey R.....
Mountain Lake
Baskett, George I.....Willmar
Baskett, Olive T.....Willmar
Bass, G. W.....Minneapolis
Bates, B. V.....Browns Valley
Baxter, S. H.....Minneapolis
Bayley, E. H.....Lake City
Beach, Watson.....Rochester
Beadle, W. D.....Cannon Falls
Beals, Hugh.....St. Paul
Beard, Archie H.....Minneapolis
Beaty, J. H.....St. Cloud
Becker, Samuel William.....
Rochester
Bedford, E. W.....Minneapolis
Beede, Ethel.....Faribault
Behmler, Fred W.....Appleton
Beise, R. A.....Brainerd
Bell, C. C.....St. Cloud
Bell, J. W.....Minneapolis
Bell, W. E.....Dodge Center
Benedict, E. E.....Minneapolis
Benedict, W. L.....Rochester
Benepe, L. M.....St. Paul
Benham, E. W.....Mankato
Benjamin, A. E.....Minneapolis
Benjamin, W. G.....Pipestone
Benn, F. G.....Minneapolis
Bennion, P. H.....St. Paul
Benoit, F. T.....Winona
Benson, R. D.....Minneapolis
Bentley, Norman P.....St. Paul
Berdez, G. L.....Duluth
Bergen, Otto.....Clinton
Bergen, Ralph D.....Rochester
Bergh, L. N.....Montevideo
Bergheim, M. C.....Hawley
Bergman, O. B.....Janesville
Bergquist, K. E.....Duluth
Berkman, D. M.....Rochester
Bernard, B. C...Thief River Falls
Berrisford, Paul D.....St. Paul
Bertelson, O. L.....Crookston
Bessesen, A. N., Jr...Minneapolis
Bessesen, A. N., Sr...Minneapolis
Bessesen, Daniel H...Minneapolis
Bessesen, W. A.....Minneapolis
Best, F. E.....Wells
Bianco, A. J.....Duluth
Biedermann, Jacob.....
Thief River Falls
Bigelow, C. E.....Dodge Center
Binet, H. E.....Grand Rapids
Binger, H. E.....St. Paul
Birnberg, T. L.....St. Paul
Bissell, F. S.....Minneapolis
Bjorgo, C. W.....Cannon Falls
Blackford, Launcelot Minor....
Rochester
Blacklock, S. S.....Hibbing
Blake, Jas.....Hopkins
Blakely, C. C.....Barnum
Blanchard, H. G.....Waseca
Blanton, Smiley.....Minneapolis
Blaustone, Henry H...Minneapolis
Blegen, H. M.....Warren
Bliss, John Herbert....Rochester
Blumenthal, Jacob...Minneapolis
Bock, R. A.....St. Paul
Bockman, M. W. H...Minneapolis
Boeckmann, Eduard.....St. Paul
Boeckmann, Egil.....St. Paul
Boehm, J. C.....St. Cloud
Bofenkamp, F. W.....Luverne
Bohland, E. H.....St. Paul
Bohling, B. S.....Sandstone
Bole, R. S.....St. Paul
Boleyn, E. S.....Stillwater
Bolsta, Chas.....Ortonville
Bolstad, H. C.....St. Paul
Boman, P. G.....Duluth
Bone, Merle.....Kelliher
Bong, J. H.....Jasper
Bonta, M. B.....Rochester
Booth, A. E.....Minneapolis
Boothby, W. M.....Rochester
Boquist, E. T. W.....Minneapolis
Boreen, C. A.....Minneapolis
Borg, Joseph F.....St. Paul
Bargeson, Egbert J.....Rochester
Borreson, B.....Remer
Bossert, C. S.....Mora
Bossingham, O. N...Lake Benton
Bouma, L. R.....St. Paul
Bouman, H. A.....Minneapolis
Bowers, H. E.....Lake City
Bowers, J. T....Thief River Falls
Bowing, H. H.....Rochester
Bowles, John H.....Rochester
Boyer, S. H.....Duluth
Boynton, Ruth.....Minneapolis
Boysen, H.....Truman
Boysen, P.....Pelican Rapids
Braasch, Wm. F.....Rochester
Brabec, F. G.....Perham
Bracken, H. M.....New York City
Braden, A. J.....Duluth
Brading, Edward Thurston....
Rochester
Bradley, E. L.....Superior
Brand, G. D.....St. Paul
Brand, W. A.....Redwood Falls
Braham, D. S.....Albert Lea
Branton, A. F.....Willmar
Branton, B. J.....Willmar
Bratrud, A. F.....Minneapolis
Bratrud, O. Edward.....Warren
Bratrud, Theodor.....Warren
Bray, C. W.....Biwabik
Bray, E. R.....St. Paul
Bregal, Fred L.....St. James
Briggs, F. W.....Duluth
Brigham, C. F.....St. Cloud
Brigham, Frank.....Watkins
Brimhall, J. B.....St. Paul
Broders, A. C.....Rochester
Brodie, Walter D.....St. Paul
Broker, W. S.....Battle Lake
Brooks, Chas. N.....Minneapolis
Brooks, D. F.....St. Paul
Brooks, G. F.....St. Paul
Brown, A. E.....Rochester
Brown, A. H.....Pipestone
Brown, Edgar D.....Minneapolis
Brown, Ed. I.....St. Paul
Brown, Edw. J.....Minneapolis
Brown, G. E.....Rochester
Brown, John C.....St. Paul
Brown, Lyle L.....Crookston
Brown, P. W.....Rochester
Brown, R. S.....Minneapolis
Browning, W. E.....Caledonia
Bryout, Oliver R.....Minneapolis
Buck, Fred H.....Shakopee
Bueerman, Winifred Henry....
Rochester
Buie, L. A.....Rochester
Bullen, F. W.....Hibbing
Bumpus, H. C.....Rochester
Burch, F. E.....St. Paul
Burfiend, G. H.....St. Paul
Burnap, W. L.....Fergus Falls
Burns, Arthur.....Rochester
Burns, F. W.....St. Paul
Burns, H. D.....Albert Lea
Burns, H. J.....Duluth
Burns, M. A.....Milan
Burns, R. L.....Two Harbors
Burns, R. M.....St. Paul
Buscher, H.....St. Paul
Bushey, M. E.....Arlington
Butler, John.....Minneapolis
Butturff, C. R.....Freeborn
Butz, J. A.....Monterey
Byrnes, W. J.....Minneapolis

Cabot, V. S.....Minneapolis
Cady, L. H.....Minneapolis
Caine, C. E.....Morris
Caldwell, David K.....St. Paul
Caldwell, Jas. P.....St. Paul
Caldwell, Kenneth S....St. Paul
Caley, G. R.....Princeton
Calhoun, F. W.....Albert Lea

Callahan, F. F.....Pokegama
Cameron, J. A.....St. Paul
Camp, W. E.....Minneapolis
Campbell, J. E.....South St. Paul
Campbell, L. M.....Minneapolis
Campbell, Robert.....Minneapolis
Cannon, Harry.....St. Paul
Carey, Jas. B.....Minneapolis
Carlaw, C. M.....Minneapolis
Carman, Paul.....St. Paul
Carman, Russell Daniel.....
Rochester
Carroll, Wm. C.....St. Paul
Carstens, C. F.....Hibbing
Carter, Fred G.....St. Paul
Cathcart, E. P.....Rochester
Catlin, John J.....Buffalo
Catlin, T. J.....Buffalo
Cavanaugh, J. O.....St. Paul
Caylor, Harold D.....Rochester
Chadbourn, A. G.....Heron Lake
Chamberlin, W. A.....Waseca
Chambers, W. C.....Blue Earth
Chandler, O. B.....St. Paul
Chapman, T. L.....Duluth
Chatterton, C. C.....St. Paul
Cheleen, S. J.....Minneapolis
Cheney, E. L.....Duluth
Cherry, Chas. H.....Minneapolis
Chorest, J. C. R.....Marshall
Christensen, E. P...Two Harbors
Christiansen, A.....St. Paul
Christenson, C. R.....Starbuck
Christianson, H. W.....Wykoff
Christie, G. R.....Long Prairie
Christie, R. L.....Long Prairie
Christison, J. T.....St. Paul
Chumley, Charles L.....Rochester
Cirkler, A. A.....Minneapolis
Clair, J. B.....Winsted
Clark, F. F.....Duluth
Clark, H. B.....St. Cloud
Clark, H. S.....Minneapolis
Clark, T. C.....Minneapolis
Clay, E. M.....Hutchinson
Clay, F. H.....St. Charles
Claydon, L. E.....Red Wing
Clement, T. G.....Duluth
Clement, J. B.....Lester Prairie
Clifford, F. F.....West Concord
Clifton, Theo. A.....Chatfield
Cobb, S. G.....St. Paul
Cobb, Willis F.....Lyle
Cochrane, W. J.....Lake City
Coffey, Jay R.....Rochester
Colby, Woodard.....St. Paul
Cole, H. B.....Redwood Falls
Cole, Wallace H.....St. Paul
Coleman, F. B.....Austin
Collie, H. G.....St. Paul
Collins, A. N.....Duluth
Collins, Harry R.....Rochester
Collins, H. C.....Duluth
Collins, J. S.....Wabasha
Colvin, A. R.....St. Paul
Comfort, Mandred Whitset..
.....Rochester
Comstock, A. E.....St. Paul
Condit, W. H.....Minneapolis
Conley, Alva A.....Cannon Falls
Conner, H. M.....Rochester
Conner, Wm. H.....St. Paul
Connor, C. E.....St. Paul
Constans, Geo. Maurice.....
.....Rochester
Cook, Henry Wireman.....
.....Minneapolis
Cook, Paul B.....St. Paul
Cooney, H. C.....Princeton
Cooper, M. D.....Winnebago City
Cooperman, H. O.....Minneapolis
Corbett, J. Frank...Minneapolis
Corrigan, J. E.....Spooner
Cory, W. M.....Waterville
Cosgriff, J. A.....Mankato
Cosman, E. O.....Minneapolis
Counseller, Virgil S....Rochester
Countryman, Roger S.....St. Paul
Covell, W. W.....St. Peter
Coventry, W. A.....Duluth
Cowern, E. W.....North St. Paul
Cowing, P. G.....Evansville
Crafts, Leo M.....Minneapolis
Craig, Wm. McK.....Rochester
Crane, Wm. Whitfield, Jr.....
Rochester
Cranmer, Richard R.....
Minneapolis
Creighton, Ralph H...Minneapolis
Cremer, M. H.....Red Wing
Cremer, Peter Hubert...Hastings
Crenshaw, J. L.....Rochester
Cress, E. E.....Boyd
Cress, P. J.....Ellsworth

Crewe, J. E.....Rochester
Critchfield, L. B.....St. Paul
Cross, J. G.....Minneapolis
Crow, E. R.....Minneapolis
Crowe, J. H.....Virginia
Crowl, Verne C.....Downey
Crume, Geo. P.....Minneapolis
Crump, J. W.....St. Paul
Culligan, Leo Courtney.....
Rochester
Culver, Lucian Glenn...Stillwater
Cumming, J. F.....Chokio
Curtin, John F.....Minneapolis
Cutts, G. A. C.....Litchfield
Cutts, George.....Minneapolis

Dack, Lloyd G.....St. Paul
Dady, Elmer E.....Minneapolis
Dahl, Elmer O.....Minneapolis
Dahl, G. A.....Mankato
Dahl, John A.....Minneapolis
Daignault, Oscar.....Benson
Daly, Joseph.....Rochester
Daniel, Donald H.....Minneapolis
Daniel, Lewis M.....Minneapolis
Daniels, J. W.....St. Peter
Daniels, W. H.....Crookston
Danielson, K. A.....Litchfield
Darling, J. B.....St. Paul
Dart, Leslie O.....Minneapolis
Daugherty, E. B.....St. Paul
Daugherty, L. E.....St. Paul
Davis, Austin Clifford.....
Rochester
Davis, B. F.....Duluth
Davis, F. U.....Faribault
Davis, Herbert.....St. Paul
Davis, H. S.....Duluth
Davis, I. Grant.....Rushford
Davis, Lloyd Thomas....Wadena
Davis, Thayer Clinton...Wadena
Davis, William.....St. Paul
Davison, P. C.....Willmar
De Boer, Hermann.....Edgerton
Dedolph, Karl.....St. Paul
Delmore, J. L.....Roseau
Dempsey, D. P.....Kellogg
Denman, A. V.....Mankato
Desjardins, Arthur W.....
Rochester
Devereaux, T. G.....Wayzata
Dezell, Earl R.....Minneapolis
Deziel, G.....Minneapolis
Dickson, Thos. H., Jr....St. Paul
Diehl, Harold S.....Minneapolis
Diessner, H. D.....Minneapolis
Disen, C. F.....Minneapolis
Ditmeier, L. M. Gerber....Jasper
Dittman, Geo. C.....St. Paul
Dixon, Claude F.....Rochester
Dobson, Herbert Victor.....
.....Rochester
Doctor, William R...Minneapolis
Dodge, F. A.....Le Sueur
Dohm, A. J.....St. Paul
Dolan, C. P.....Worthington
Dolder, F. C.....Eyota
Doms, H. C.....Slayton
Doms, Wm.....Woodstock
Donaldson, C. A.....Minneapolis
Donohue, P. F.....St. Paul
Doolittle, L. E.....Duluth
Dorge, Richard I.....Minneapolis
Dowswell, W. J.....Benson
Doxey, G. L.....Minneapolis
Drake, Carl B.....St. Paul
Drake, C. R.....Minneapolis
Drake, F. A.....Lanesboro
Dredge, H. P.....Sandstone
Drenning, F. C.....Duluth
Driesbach, N.....Minneapolis
Drips, D. G.....Rochester
Drought, W. W....Fergus Falls
Dryden, F. M.....Crookston
Dubbe, F. H.....New Ulm
DuBois, J. F.....Sauk Center
Dudley, J. H.....Windom
Dulude, S.....Dassel
Dumas, Alexander G.....
.....Minneapolis
Dunlap, E. H.....Minneapolis
Dunlap, H. F.....Rochester
Dunlap, Alex.....Crookston
Dunn, Geo. Robt.....Minneapolis
Dunn, J. N.....St. Paul
Dunn, Louis.....Minneapolis
Dunne, Gerald P.....St. Paul
Dunsmoor, F. A.....Minneapolis

Earl, George A.....St. Paul
Earl, Robert O.....St. Paul
Eberlin, E. A.....Glenwood
Eby, C. B.....Spring Valley

Ecklund, E. C.....Hibbing
Eckman, P. F.....Duluth
Eckstein, A. W.....Comfrey
Edlund, G.....St. Paul
Edwards, Ralph T.....Elysian
Eirley, Clara G.....
.....Mt. Pleasant, Iowa
Eisler, Edwin R.....Boston
Eitel, Geo. D.....Minneapolis
Eitel, G. G.....Minneapolis
Egilsrud, Kristian...Minneapolis
Ehrenberg, C. J.....Minneapolis
Ekblad, J. W.....Duluth
Eklund, Wm. J.....Duluth
Elias, F. J.....Duluth
Ellison, David E.....Minneapolis
Ellison, Frank E.....Monticello
Elsey, J. R.....Glenwood
Ely, O. S.....South St. Paul
Emerson, E. C.....St. Paul
Empie, W. M.....Virginia
Endress, E. K.....St. Paul
Engberg, E. J.....St. Paul
Engelhart, P. C.....Wood Lake
Engh, Sigfred.....Cottonwood
Erv, F. A.....Minneapolis
Ericson, J. A.....Minneapolis
Ericson, Swan.....Le Sueur
Ernest, G. C.....St. Paul
Ertel, E. Q.....Ellendale
Eshelby, E. C.....St. Paul
Eskew, Don Carlos.....Rochester
Esser, John.....Perham
Estrem, C. O.....Fergus Falls
Estrem, T. A.....Hibbing
Eusterman, G. B.....Rochester
Evarts, Arrah B.....Rochester
Everlop, J. L.....Minneapolis
Ewing, C. F.....Wheaton

Fahey, E. W.....St. Paul
Fansler, W. A.....Minneapolis
Farr, R. E.....Minneapolis
Farrell, J. C.....Arlington
Farrist, R. C.....Sherburn
Faust, Louis Sanders..Rochester
Fawcett, C. E.....Stewartville
Feidt, W. M.....Minneapolis
Ferguson, J. C.....St. Paul
Ferreira, G. J.....Aurora
Fesler, Harold H.....St. Paul
Figi, F. A.....Rochester
Fink, Walter H. ...Minneapolis
Finney, W. P.....Rochester
Fischer, G.....Minneapolis
Fischer, H. P.....Shakopee
Fischer, O. F.....Houston
Fischer, Mario McC.....Duluth
Fischer, P. M.....Shakopee
Fischback, Frederic C..Rochester
Fisher, J. M.....St. Peter
Fitzgerald, E. T.....Morris
Fjeldstad, C. Alfred..Minneapolis
Fjellman, R. C. .....Minneapolis
Flagstad, A. E.....St. Paul
Fleischhauer, D. S.....Wabasha
Fleming, A. S.....Minneapolis
Fleming, James.....Cloquet
Fleming, T. N.....St. Cloud
Flinn, B. P.....Redwood Falls
Flinn, F. E.....Redwood Falls
Flocken, Chas. F.....Minneapolis
Flom, A. O.....Chisago City
Flothow, Paul G.....Rochester
Flower, W. Z.....Minneapolis
Fogarty, Chas. W.....St. Paul
Foley, F. E. B.....St. Paul
Folken, F. G.....Albert Lea
Forbes, R. S.....Duluth
Ford, Burton C.....Marshall
Ford, Frances A.....Rochester
Forrest, C. G.....Clearbrook
Forsberg, Carl W.....Rochester
Fowler, L. H.....Minneapolis
Franchere, F. W.....Lake Crystal
Franzen, H. G.....Minneapolis
Freeborn, J. A.....Fergus Falls
Freed, O. J. R.....Cokato
Freeman, C. D.....St. Paul
Freeman, G. E.....St. Peter
Freeman, J. P.....Glenville
Freeman, W. L.....St. Cloud
French, E. A.....Plainview
French, H. S.....New London
Friedell, A.....Minneapolis
Friesleben, Wm.....Sauk Rapids
Frisch, F. P.....Richmond
Fritsche, Albert.....New Ulm
Fritsche, L. A.....New Ulm
Froelich, H. W..Thief River Falls
Frost, E. H.....Willmar
Fuerste, Frederick.....Proctor
Fugina, George R.....Mankato
Fulton, J. F.....St. Paul

Gaarde, F. W.....Rochester
Gager, E. C.....St. Paul
Gaines, E. C.....Buffalo Lake
Gallagher, B. J.....Waseca
Gamble, J. W.....Albert Lea
Gamble, P. M.....Albert Lea
Gamble, Ross M.....Ellendale
Gammell, J. H.....Minneapolis
Garbrecht, Arthur.....St. Paul
Gardiner, D. G.....St. Paul
Gardner, Edwin L....Minneapolis
Gardner, V. H.....Waseca
Garlock, A. V.....Bemidji
Garlock, D. H.....Bemidji
Garwin, John Day.....Rochester
Gates, C. E.....Anoka
Gault, C. C.....Owatonna
Gausemel, S. D.....Goodhue
Gay, James G.....Rochester
Gauthier, W. L.....Virginia
Geer, Everett K.....St. Paul
Geissenger, John D.....St. Paul
Geist, Emil S.....Minneapolis
Geist, George A.....St. Paul
Gelz, J. J.....St. Cloud
Gendron, J. F.....Grand Rapids
Gerber, Milo P.....Brainerd
Germo, Chas.....Balaton
Ghent, C. Harry.....St. Paul
Ghent, M. M.....St. Paul
Gibbon, L. L.....Lowry
Giere, E. O.....St. Paul
Giessler, Paul W.....Minneapolis
Giffin, H. Z.....Rochester
Gilbert, John D.....Carlton
Gilfillan, J. S.....St. Paul
Gilles, F. L.....Minneapolis
Gillespie, N. H.....Duluth
Gillespie, M. G.....Duluth
Gilmore, R.....Bemidji
Ginsberg, Wm.....St. Paul
Gipner, John F.....Rochester
Giroux, A. A.....Duluth
Goeckerman, W. H.....Rochester
Goehrs, H. W.....St. Cloud
Goldberg, Isadore M..Minneapolis
Golden, C. M.....Tyler
Goltz, E. V.....St. Paul
Goodson, Catherine M.....
.....Retreat, Pa.
Gordon, Geo. J.....Minneapolis
Gosin, D. F.....Minneapolis
Gosslee, G. L.....Moorhead
Gough, W. H.....Granada
Graham, David.....Duluth
Graham, R. D.....Duluth
Graham, Robert.....Duluth
Grant, H. W.....St. Paul
Gratzek, Thos.....St. Paul
Grave, Floyd.....Minneapolis
Grawn, F. A.....Duluth
Gray, F. D.....Marshall
Gray, Royal C.....Graceville
Greeley, L. Q.....Duluth
Green, E. K.....Minneapolis
Greene, Carl Hartley..Rochester
Greene, Charles L.....St. Paul
Greene, Earle Ira....Rochester
Greene, W. P.....Minneapolis
Greenlee, Daniel P....Rochester
Greisheimer, Esther M.....
.....Minneapolis
Griffin, P. J.....Gary
Grimes, H. B.....Madella
Grinnell, W. B.....Preston
Grise, W. B.....Austin
Grob, Otto.....Rochester
Ground, H. T.....Virginia
Grover, F. E.....Duluth
Gruenhagen, Arnold P....St. Paul
Gullixson, A.....Albert Lea
Gunderson, Harley J.....
.....Minneapolis
Gunderson, Nels A...Minneapolis
Gunz, A. N.....Center City

Habein, Harold C.....Rochester
Haberman, E.....Osakis
Hacking, Frank H...Minneapolis
Haessley, S. B.....Faribault
Hagaman, Geo. K.....St. Paul
Hagen, G. L.....Minneapolis
Hagen, H. O.....New Richland
Hagen, O. E.....Butterfield
Hagen, O. J.....Moorhead
Haggard, G. D.....Minneapolis
Haight, G. G.....Audubon
Haines, J. H.....Stillwater
Haines, S. F.....Rochester
Hall, A. R.....St. Paul
Hall, E. L.....Princeton
Hall, J. M.....Minneapolis
Hallberg, C. A.....Rochester
Hallenbeck, D. F.....Rochester
Halloran, Walter J.....Jackson
Halper, Philip.....St. Paul
Hamel, Arnold L.....Minneapolis
Hamilton, A. S.....Minneapolis
Hamlin, George B...Minneapolis
Hammermeister, Theodore F...
.....New Ulm
Hammes, E. M.....St. Paul
Hammond, A. J.....Minneapolis
Hammond, J. F.....St. Paul
Hamrick, Robert A....Rochester
Hand, John R.....Rochester
Hand, W. R.....Elbow Lake
Haney, C. L.....Duluth
Hanse, Elmer H.....Minneapolis
Hansen, Erling.....Minneapolis
Hansen, Olga S.....Minneapolis
Hanson, A. M.....Faribault
Hanson, H. J.....Minneapolis
Hanson, H. V.....Minneapolis
Hare, E. R.....Minneapolis
Hargis, Estes Henry...Rochester
Harmon, G. E.....St. Paul
Harriman, L.....Howard Lake
Harrington, C. D.....Minneapolis
Harrington, Ethel R...Rochester
Harrington, F. E.....Minneapolis
Harrington, S. W.....Rochester
Harshbarger, Isaac Long.....
.....Rochester
Hart, A. B.....Owatonna
Hartley, E. C.....St. Paul
Hartman, H. R.....Rochester
Hartzell, Thos. B.....Minneapolis
Hatch, W. E.....Duluth
Hauge, M. M.....Clarkfield
Haugen, G. T.....Fergus Falls
Hassett, Roger G.....Bird Island
Hauser, V. P.....St. Paul
Haverfield, Addie K...Minneapolis
Hawkins, V. J.....St. Paul
Hawkinson, L. F.....Brainerd
Hayes, J. M.....Minneapolis
Head, G. D.....Minneapolis
Healy, R. T.....Pierz
Hearn, Wm. O.....Minneapolis
Heath, A. C.....St. Paul
Hebeisen, M. B.....Carver
Hedback, A. E.....Minneapolis
Hedenstrom, L. H.....Cambridge
Heetdecks, D. R.....Rochester
Hefke, Hans W.....St. James
Hegge, C. A.....Austin
Hegge, O. H.....Austin
Heim, Russell R.....Minneapolis
Heimark, J. H.....Moorhead
Heimark, O. E.....Duluth
Heise, W. F. C.....Winona
Helk, H. H.....Minneapolis
Helland, G. M.....Spring Grove
Helland, J. W.....Spring Grove
Helmholz, H. F.....Rochester
Hemingway, Robert W.....
.....Stillwater
Hempstead, B. E.....Rochester
Hemstead, Werner.....St. Cloud
Hench, Philip S.....Rochester
Henderson, A. J.....Kiester
Henderson, Earl Fletcher.....
.....Rochester
Henderson, M. S.....Rochester
Hendrickson, J. F...Minneapolis
Hengstler, W. H.....St. Paul
Henney, Wm. H.....McIntosh
Henriksen, H. G.....Elko
Henry, C. E.....Minneapolis
Henry, Myron O.....Minneapolis
Hensel, C. N.....St. Paul
Henslin, A. E.....Le Roy
Herbst, Wm. P.....Minneapolis
Herman, Arthur L...Minneapolis
Hermanson, Peter E.....Brainerd
Herrmann, S. F.....Welcome
Hertel, G. E.....Austin
Hesselgrave, S. S.....St. Paul
Heyerdale, O. C.....Rochester
Hiebert, J. P.....Minneapolis
Hielscher, Helen H.....Mankato
Hielscher, Julian A.....Mankato
Higbee, Paul A.....Minneapolis
Higgins, J. H.....Minneapolis
Hilger, A. W.....St. Paul
Hilger, D. D.....St. Paul
Hilger, J. M.....Iona
Hilger, L. A.....St. Paul
Hill, Eleanor J.....Minneapolis
Hill, Frederick E.....Duluth
Hirschboeck, F. J.....Duluth
Hirschfield, F. R.....Minneapolis
Hirschfield, M. S.....Duluth
Hoaglund, A. W.....Minneapolis
Hobbs, C. A.....Minneapolis
Hochfilzer, J. J.....St. Paul
Hodapp, R. J.....Willmar
Hodge, S. V.....Minneapolis
Hodgson, H. H.....Crookston
Hoff, Alfred.....St. Paul
Hoff, Peder A.....St. Paul
Hoffman, Max H.....St. Paul
Hoidale, A. D.....Tracy
Hoiland, A. S.....Minneapolis
Holbrook, J. S.....Mankato
Holcomb, J. T.....St. Paul
Holcomb, O. W.....St. Paul
Holdridge, Geo.....Foley
Holen, T.....Minneapolis
Holl, P. M.....Minneapolis
Holland, W. H.....Fisher
Holm, Geo. A.....Minneapolis
Holm, H. H.....Glencoe
Holman, C. J.....Mankato
Holman, E. E.....Pine River
Holmberg, L. J.....Canby
Holmes, A. E.....Rush City
Holmes, W. B.....Ada
Holloway, Jackson K.....
.....Rochester
Holst, C. F.....Little Falls
Holst, J. B.....Little Falls
Holte, H.....Crookston
Horton, Bayard A.....Rochester
Horwitz, Alex.....Rochester
House, Z. E.....Cass Lake
Hovde, H.....Duluth
Howard, Merrill A.....St. Paul
Howard, William H...Minneapolis
Howard, W. S.....St. Paul
Huenekens, E. K.....Minneapolis
Huffman, Lester Dale..Rochester
Hufford, Alvin Ray....Rochester
Hughes, Louis D.....Minneapolis
Hultkrans, Joel C.....St. Paul
Humphrey, E. W.....Moorhead
Humphrey, W. R.....Stillwater
Hunt, F. N.....Fairmont
Hunt, H. E.....St. Paul
Hunt, India.....Rochester
Hunt, R. C.....Fairmont
Hunt, V. C.....Rochester
Hunte, A. F.....Truman
Huxley, F. R.....Faribault
Hvoslef, Jacob.....
.....International Falls
Hynes, James.....Minneapolis
Hynes, John E.....Minneapolis

Ide, A. W.....St. Paul
Ikeda, Kano.....Minneapolis
Ingerson, C. A.....St. Paul
Irvine, H. G.....Minneapolis

Jacobs, John C.....Willmar
Jacobs, Minerd F.....Rochester
Jacquot, G. L.....Tyler
Jamieson, Earl....Walnut Grove
Jennings, Mary H....Minneapolis
Jensen, Harry.....Minneapolis
Jensen, J. C.....Hendricks
Jensen, Julius.....Starbuck
Jensen, M. J.....Minneapolis
Jensen, T. J.....Duluth
Jepson, P. W.....Rochester
Jesion, J. W.....St. Paul
Joannides, Minas.....Minneapolis
Johnson, A. C.....Rochester
Johnson, A. E.....Minneapolis
Johnson, A. E.....Red Wing
Johnson, A. Elof.....Minneapolis
Johnson, Asa M.....St. Paul
Johnson, C. M.....Dawson
Johnson, Ellsworth.....Windom
Johnson, Hans.....Kerhoven
Johnson, Hartland C.....St. Paul
Johnson, H. M.....Dawson
Johnson, H. P.....Fairmont
Johnson, James A....Minneapolis
Johnson, Julius.....Minneapolis
Johnson, Nimrod A...Minneapolis
Johnson, O. V.....Sebeka
Johnson, R. A.....Minneapolis
Johnson, Ray G.....St. Paul
Johnson, Selmer M...Minneapolis
Johnson, T. H.....St. Paul
Jones, A. W.....Red Wing
Jones, D. C.....St. Paul
Jones, E. M.....St. Paul
Jones, G. M.....Minneapolis
Jones, H. T.....Rochester
Jones, H. W.....Minneapolis
Jones, Richard N.....Richmond
Jones, W. A.....Minneapolis
Josewich, Alexander.....
.....Minneapolis
Josewski, R. J.....Stillwater
Joyce, G. T.....Rochester
Judd, E. S.....Rochester
Judge, Walter T.....Graceville
Juergens, H. M.....Belle Plaine

Juliar, R. O.....St. Clair

Kahala, Arthur.....Crookston
Kalinoff, D.....Stillwater
Kamman, Gordon R.....St. Paul
Kamp, B. A.....Albert Lea
Kannary, E. L.....St. Paul
Kanne, C. W.....Faribault
Karn, B. R.....Ortonville
Kaufman, A. J.....Franklin
Kaufman, Wm. C.....Appleton
Kean, N. D.....Coleraine
Keeling, Louis F.....Lakefield
Keith, N. M.....Rochester
Kelly, B. W.....Aitkin
Kelly, John V.....St. Paul
Kelly, Paul H.....St. Paul
Kelly, Thomas C.....Mankato
Kelsey, C. G.....Hinckley
Kemp, A. F.....Mankato
Kennedy, C. C.....Minneapolis
Kennedy, Jane F.....Minneapolis
Kennedy, Roger L. J.....Rochester
Kennedy, R. Ray.....Minneapolis
Kennedy, W. A.....St. Paul
Kenny, H. F.....St. Paul
Kerlan, S. Z.....Aitkin
Kern, M. J.....St. Cloud
Kernohan, J. W.....Minneapolis
Kesting, Herman.....St. Paul
Keyes, C. R.....Duluth
Keyes, E. D.....Winona
Kibbe, O. A.....Minneapolis
Kiefer, M. A.....Sleepy Eye
Kierland, P. E.....Alexandria
Kilbride, J. S.....Canby
Kilfoy, Edward Joseph.....Rochester
Kimball, H. H.....Minneapolis
Killins, Wendell A.....Rochester
King, E. A.....Minneapolis
King, W. R.....Minneapolis
King, W. S.....Eveleth
King, Z. P.....St. Paul
Kingsbury, E. M.....Clearwater
Kinsella, T. J.....Minneapolis
Kirchner, Augustus.....Rochester
Kirk, G. P.....East Grand Forks
Kistler, A. S.....St. Paul
Kistler, C. M.....Minneapolis
Kittelson, Olaf.....Minneapolis
Kittelson, T. N.....Fergus Falls
Kjelland, J. S.....East Ellsworth, Wis.
Klaveness, E.....Monticello
Klein, Harry.....Duluth
Klein, H. N.....St. Paul
Klima, W. W.....Stewart
Knapp, F. N.....Duluth
Knauff, M. K.....St. Paul
Knight, H. L.....Minneapolis
Knight, Ralph T.....Minneapolis
Knight, Ray Roberts.....Minneapolis
Knudtson, H. M.....Browerville
Koch, John Charles.....Minneapolis
Kohlbry, C. O.....Duluth
Kohler, D. W.....St. Joseph
Kohler, F. G.....Minneapolis
Kohler, G. A.....Minneapolis
Koller, Herman M.....Minneapolis
Koller, L. R.....Minneapolis
Kooiker, Herman J..N. Albert Lea
Kraft, Peter.....Duluth
Kremer, Walter J.....Minneapolis
Kriedt, Daniel.....Minneapolis
Kucera, Wm. J.....Minneapolis
Kuhlman, Aug.....Melrose
Kusske, A. L.....New Ulm
Kuth, J. R.....Duluth
Kvitrud, G.....Minneapolis

Laird, A. T.....Nopeming
Lajoie, John M.....Minneapolis
Landeen, F. G.....Stillwater
Lane, Laura A.....Minneapolis
Laney, R. L.....Puposky
Langenderfer, F. V.....St. Paul
Langhoff, A. H.....Glencoe
Lannin, J. C.....Mabel
Lapierre, A. P.....Minneapolis
La Pierre, C. A.....Minneapolis
Lapp, Victor Ray.....Rochester
Larsen, C. L.....St. Paul
Larson, A. L.....Fertile
Larson, L. M.....Brainerd
Larson, M. L.....St. Paul
Larson, O. O.....Detroit
Latchford, James Kyran.....Rochester
Laurent, A. A.....Minneapolis
La Vake, R. T.....Minneapolis
Law, A. A.....Minneapolis
Lax, Morris H.....St. Paul
Leahy, Bartholomew.....St. Paul
Leavenworth, Richard O..St. Paul
Leavitt, H. H.....Minneapolis
Lebowski, Joseph A..Minneapolis
Leck, Clifford C.....Austin
Le Clerc, J. E.....Le Sueur
Lee, H. M.....Minneapolis
Lee, J. L.....Watertown
Lee, W. A.....Fergus Falls
Lee, W. P.....Northfield
Leibold, H. H.....Parkers Prairie
Leicht, O.....Winona
Leitch, Archibald.....St. Paul
Leland, John T.....Herman
Leland, M. N.....Minneapolis
Lemon, W. S.....Rochester
Lemstrom, Jarl.....Minneapolis
Leonard, L. J.....Minneapolis
Leopard, B. A.....New Richland
Lepak, F. J.....Duluth
Lepak, John A.....St. Paul
Lerch, William.....St. Paul
Leuty, Amos.....Morris
Lewis, A. J.....Henning
Lewis, C. B.....St. Cloud
Lewis, E. J.....Sauk Center
Lewis, J. B.....S. St. Paul
Lewis, W. W.....St. Paul
Lexa, F. J.....Lonsdale
Libert, John N.....St. Cloud
Lichtenstein, H.....Winona
Lick, C. Louis.....St. Paul
Liedloff, A. G.....Mankato
Lillie, H. I.....Rochester
Lillie, W. I.....Rochester
Lima, Ludvig.....Montevideo
Lind, C. J.....Minneapolis
Lindberg, A. L.....Wheaton
Linde, Herman.....Cyrus
Lindgren, E. I.....Duluth
Lindquist, R. H.....Minneapolis
Lindsay, W. V.....Winona
Lindsey, Maude L.....Rochester
Linner, H. P.....Minneapolis
Linton, W. B.....Rochester
Lippman, Hyman S..Minneapolis
List, Walter E.....Minneapolis
Litchfield, John T..Minneapolis
Litman, Samuel N..Meadowlands
Little, D. W.....Appleton
Little, W. J.....St. Paul
Litzenberg, J. C.....Minneapolis
Lloyd, H. J.....Mankato
Locken, O. E.....Crookston
Logan, A. H.....Rochester
Logan, F. W.....Blue Earth
Logefell, Rudolph C..Minneapolis
Lommen, P. A.....Austin
Long, Jesse.....Minneapolis
Loomis, E. A.....Minneapolis
Love, Fred A.....Carlos
Lowe, Earl R.....St. Paul
Lowe, Thos.....Pipestone
Luden, Georgine.....Rochester
Luedtke, G. H.....Fairmont
Lum, C. E.....Duluth
Lundgren, A. C.....Minneapolis
Lundholm, A. M.....St. Paul
Lundy, John S.....Rochester
Lyday, Russell Osborne.....Rochester
Lyman, F. V.....Grove City
Lynch, M. J.....Minneapolis
Lyng, John A.....Minneapolis
Lysne, Henry.....Minneapolis

McBeath, Ewing C.....St. Paul
McBroom, D. E.....Faribault
McCann, D. F.....Bemidji
McCarthy, Donald.....Minneapolis
McCarthy, W. J.....Madelia
McCarthy, W. R.....St. Paul
McCartney, James S..Minneapolis
McCarty, P. D.....Babbitt
McClanahan, J. B.....White Bear
McClanahan, T. S.....White Bear
McCloud, C. N.....St. Paul
McComb, C. F.....Duluth
McCoy, Mary.....Duluth
McCrea, James.....Fulda
McDaniel, Orianna..Minneapolis
McDavitt, Thos.....St. Paul
McDonald, A. L.....Duluth
McDowell, J. P.....St. Cloud
McEachran, A.....Minneapolis
McFarland, A. H.....Minneapolis
McGandy, R. F.....Minneapolis
McGeary, Geo. E.....Minneapolis
McGiffert, E. N.....Duluth
McGroarty, J. J.....Easton
McGuigan, H. T.....Red Wing
McHaffie, O. L.....Duluth
McHugh, Roderick F.....Aitkin
McIntire, H. M.....Waseca
McIntyre, E. H.....Virginia
McIntyre, Geo.....Minneapolis
McIntyre, John A.....Owatonna
McKaig, Carle B.....Pine Island
McKeithen, A. M.....Rochester
McKenna, J. K.....Austin
McKeon, James.....St. Paul
McKeon, J. O.....Montgomery
McKeon, Owen.....St. Paul
McKeown, E. G.....Pipestone
McKibben, H. E.....St. Cloud
McKinley, C. A.....Minneapolis
McKinney, F. S.....Minneapolis
McKnight, Roy B.....Rochester
McLaren, Jennette M.....St. Paul
McLaughlin, E. M.....Winona
McMurtry, Walter C.....Virginia
McNevin, C. F.....St. Paul
McPheeters, H. O.....Minneapolis
McQuiggan, Mark Ronald.....Rochester
McVicar, Chas. S.....Rochester
MacDonald, A. E.....Minneapolis
MacDonald, D. A.....Minneapolis
MacDonald, Irving C..Minneapolis
MacRae, G. A.....Duluth
Mach, Frank B.....Minneapolis
Macnie, J. S.....Minneapolis
Maertz, W. F.....New Prague
Magath, T. B.....Rochester
Magie, W. H.....Duluth
Magney, F. H.....Duluth
Mahle, A. E.....Rochester
Mahwald, A.....Albany
Maland, C. O.....Minneapolis
Maloney, T. J.....St. Paul
Manley, J. R.....Duluth
Mann, A. T.....Minneapolis
Manson, F. M.....Worthington
Marcley, W. J.....Minneapolis
Mariette, Ernest.....Hopkins
Mark, D. B.....Minneapolis
Marsh, Fred Eugene...Rochester
Martineau, J. L.....St. Paul
Masson, D. M.....Rochester
Masson, J. C.....Rochester
Mathews, Justus.....Minneapolis
Mattill, P. M.....Oak Terrace
Maxeiner, Stanley R..Minneapolis
May, W. H.....Minneapolis
Mayfield, A. L.....Rochester
Mayland, M. L.....Faribault
Mayo, C. H.....Rochester
Mayo, W. J.....Rochester
Maytum, Charles K....Rochester
Mead, Marion.....Minneapolis
Meckstroth, C. W.....Brandon
Mee, P. H.....Osseo
Meierding, Wm. A....Springfield
Meilicke, W. A.....Nicollet
Melby, Benedik.Blooming Prairie
Melzer, G. R.....Lyle
Mentzer, Stanley H....Rochester
Merkert, Charles E..Minneapolis
Merkert, G. L.....Minneapolis
Merriman, L. L.....Duluth
Mesker, G. H.....Olivia
Metcalf, F. W.....Fulda
Meyer, A. A.....Melrose
Meyer, E. L.....Minneapolis
Meyer, P. S.....Faribault
Meyerding, E. A.....St. Paul
Meyerding, H. W.....Rochester
Michael, J. C.....Minneapolis
Michelson, H. E.....Minneapolis
Milan, M. Geo.....Warren
Miller, H. A.....Waseca
Miller, V. I.....Mankato
Miller, W. A.....New York Mills
Mills, J. L.....Winnebago City
Millspaugh, J. G.....Little Falls
Mingo, F. E.....Hugo
Mitchell, A. B.....Hector
Mitchell, Frederick.....St. Paul
Mitchell, R. S.....Grand Meadow
Moersch, F. P.....Rochester
Moersch, H. J.....Rochester
Moffatt, A. G.....Howard Lake
Mogilner, S. N.....St. Paul
Moir, Wm. W.....Minneapolis
Molander, H. A.....St. Paul
Moloney, G. R.....Belle Plaine
Monahan, R. H.....Minneapolis
Monroe, P. B.....Soudan
Montgomery, Hamilton.Rochester
Moore, A. B.....Rochester
Moorhead, M. B.....Minneapolis

Morcom, H. W.....Duluth
More, C. W.....Eveleth
Morem, Edwin.....Minneapolis
Moriarity, Cecile R...Minneapolis
Mork, B. O.....Worthington
Morley, G. A.....Crookston
Morris, Francis J.....Prior Lake
Morris, R. Edwin.....St. Paul
Morrison, A. W.....Minneapolis
Morrissey, F. B.....St. Paul
Morrow, Jas. J.....Austin
Morse, M. P.....LeRoy
Morsman, L. W.....Hibbing
Morss, C. R.....Zumbrota
Mortenson, N. G.....St. Paul
Morton, Chas. Bruce..Rochester
Moses, Joseph, Jr.....Northfield
Moskovitz, Selic.....St. Paul
Moss, Myer, N.....St. Paul
Moynihan, A. F.....Sauk Center
Moynihan, T. J.....St. Paul
Muhme, Norman Benedict...
.....Rochester
Muller, R. Theo.....St. Paul
Murphy, E. F.....St. Paul
Murphy, F. J.....Minneapolis
Murphy, Leo.....Minneapolis
Murray, D. D.....Duluth
Murray, W. R.....Minneapolis
Mussey, R. D.....Rochester
Myers, J. A.....Minneapolis
Myers, Thos.....St. Paul
Myre, C. R.....Paynesville

Naegeli, Frank.....Fergus Falls
Nagel, G. W.....Rochester
Nannestad, J. R.....Albert Lea
Nass, H. A.....Mabel
Nathanson, M. H.....Minneapolis
Nauth, W. W.....Winona
Neal, J. M.....Minneapolis
Neher, F. H.....St. Paul
Nelson, C. P.....Owatonna
Nelson, E. H.....Chisholm
Nelson, H. E.....Crookston
Nelson, H. S.....Minneapolis
Nelson, L. A.....St. Paul
Nelson, Marque O.....Rochester
Nelson, M. S.....Granite Falls
Nelson, Nesmuth.....Brainerd
Nelson, O. E.....Minneapolis
Nelson, O. N.....Battle Lake
Nerad, Anton H.....Argyle
Nesbit, Harold T.....St. Paul
Neumann, C. A.....Lewiston
Neumann, W. H.....Sheboygan
New, G. B.....Rochester
Newhart, Horace....Minneapolis
Newman, G. A.....Stillwater
Nichols, A. E.....St. Paul
Nicholson, M. A.....Duluth
Nickel, Allen A. C.....Rochester
Nippert, H. T.....St. Paul
Nippert, L. A.....Minneapolis
Nissen, Henrik.....Minneapolis
Nixon, Samuel H.....Minneapolis
Noonan, Dan F.....Minneapolis
Noran, A. N.....Minneapolis
Nordin, C. G.....St. Paul
Nordin, G. T.....Minneapolis
Nordland, Martin....Minneapolis
Norman, J. F.....Crookston
Norrgard, H. T.....Milaca
Norris, Edgar H.....St. Paul
Norris, J. F.....St. Peter
Norris, G. H.....Annandale
Noth, H. W.....Minneapolis
Nusbaum, D. H...Storm Lake, Ia.
Nye, Katherine A.....St. Paul
Nye, Lillian L.....St. Paul

O'Brien, H. J.....St. Paul
O'Connor, I. A.....St. Paul
O'Connor, J. P.....St. Paul
O'Donnell, D. M.....Ortonville
O'Donnell, J. E.....Minneapolis
O'Hara, J. J.....Janesville
O'Leary, P. A.....Rochester
Oberg, C. M.....Minneapolis
Ocksenhirt, Norman C..Rochester
Oerting, Harry.....St. Paul
Offutt, Susan R.....Rochester
Ogden, Warner.....St. Paul
Ohage, Justus.....St. Paul
Ohage, Justus, Jr.....St. Paul
Ohlinger, L. B.....Minneapolis
Ohnstad, J. L.....McIntosh
Oliver, C. I.....Graceville
Olson, Albert E.....Duluth
Olson, Chas. A.....St. Paul
Olson, Chester J.....Belle Plaine
Olson, Ernest A.....Pine Island
Olson, F. A.....Minneapolis
Olson, G. M.....Minneapolis
Olson, Olaf A.....Minneapolis
Olson, R. G.....Minneapolis
Omohundro, Miles Parker...
.....Rochester
Onsgard, C. K.....Halstad
Onsgard, L. K.....Houston
Opheim, O. V....Philadelphia, Pa.
Oppegaard, C. L.....Crookston
Oppegaard, M. O.....Crookston
Oredson, O. A.....Duluth
Ortman, John Wessel.....Pierz
Osborn, Lida.....Mankato
Osburn, B. F.....
.....International Falls
Ostergren, E. W.....St. Paul
Otto, H. C.....Frazee
Overend, H. V.....Hallock
Owre, Oscar.....Minneapolis

Palmer, C. F.....Albert Lea
Palmer, W. L.....Albert Lea
Paradine, J.....Duluth
Pardee, Katherine.....
.....Northampton, Mass.
Parker, B. R.....Rochester
Parker, J. William....Rochester
Parker, O. W.....Ely
Parker, Stephen Thomas....
.....Rochester
Parks, A. H.....Minneapolis
Parson, L. R.....Elbow Lake
Passer, A. A.....Olivia
Patterson, W. E.....Minneapolis
Patterson, W. E.....Westbrook
Patterson, W. L.....Fergus Falls
Paulsen, E. L.....Minneapolis
Paulson, C. W.....North Branch
Paulson, T. S.....Fergus Falls
Payette, C. H.....Duluth
Pearce, N. O.....Minneapolis
Pearsen, William T.....Russell
Pearson, F. R.....St. Paul
Pedersen, A. H.....St. Paul
Pederson, Harold....Minneapolis
Pederson, O. J.....Hanska
Pederson, R. M.....Minneapolis
Pemberton, J. deJ.....Rochester
Penhall, F. W.....Morton
Pennie, D. F.....Duluth
Peppard, T. A.....Minneapolis
Perry, C. G.....St. Paul
Perry, Ralph St. John....
.....Minneapolis
Peters, R. M.....Minneapolis
Petersen, Thorvald..Minneapolis
Peterson, A. A.....Mora
Peterson, Alfred.....Dassel
Peterson, Christian....Owatonna
Peterson, H. E.....Granite Falls
Peterson, O. H.....Minneapolis
Peterson, O. L.....Cokato
Peterson, R. A.....Vesta
Peterson, V. N.....St. Paul
Peterson, Willard C..Minneapolis
Pettit, C. W.....Minneapolis
Peyton, Wm. T.....Minneapolis
Pfaff, E. K.....Shoals, Ind.
Phelps, Kenneth A...Minneapolis
Phillips, A. E.....Delano
Pierce, Chas. H.....Wadena
Pierson, Claude M.....Wheaton
Pilon, P. C.....Paynesville
Pineo, W. B.....Minneapolis
Piper, M. C.....Rochester
Piper, Wm. A....Mountain Lake
Plankers, A. G.....Rochester
Platou, E. S.....Minneapolis
Plondke, F. J.....St. Paul
Plonske, C. J.....Faribault
Plummer, H. S.....Rochester
Plummer, W. A.....Rochester
Poehler, F. T.....Minneapolis
Poirier, J. A.....Forest Lake
Pollock, L. W.....Rochester
Poppe, Fred H.....Minneapolis
Powell, L. D.....Rochester
Power, J. E.....Duluth
Powers, F. W.....Barrett
Prangen, A. D.....Rochester
Pratt, Fred J.....Minneapolis
Pratt, J. A.....Minneapolis
Preine, I. A.....Minneapolis
Prickman, Louis Elwood....
.....Rochester
Prim, J. A.....Minneapolis
Pritchard, D. B.....Winona
Proshek, Charles E..Minneapolis
Puffer, F. L.....Bird Island
Pugliese, Frank M.....Rochester

Quigley, T. C.....Owatonna
Quinby, Thomas F...Minneapolis
Quist, H. W.....Minneapolis

Raadquist, C. S.....Hibbing
Radabaugh, R. C.....Hastings
Radtke, H. P.....Chisholm
Rains, J. M.....Willmar
Raiter, Franklin W. S....Cloquet
Raiter, Roy F.....Cloquet
Ramsey, W. R.....St. Paul
Randall, Lawrence Merrill...
.....Rochester
Ransom, L. M.....Hancock
Ratcliffe, J. J.....Aitkin
Rathbun, A. M.....Rice
Rathbun, C. A.....St. Cloud
Reed, Chas. A.....Minneapolis
Rees, S. P.....Minneapolis
Reeve, E. T.....Elbow Lake
Reeves, C. E.....Eagle Bend
Regnier, E. A.....Minneapolis
Reid, J. Spence.....Rochester
Reineke, George F.....New Ulm
Reiter, H. W.....Shakopee
Replogle, W. H.....Wabasha
Reynolds, J. S.....Minneapolis
Rhines, D. C.....Caledonia
Rice, G. D.....St. Cloud
Richards, E. T. F.....St. Paul
Richards, W. B.....St. Cloud
Richardson, Fred S.....Belgrade
Richardson, Harold E...St. Paul
Richardson, W. E.....Pipestone
Richardson, W. J.....Fairmont
Richdorf, L. F.....Minneapolis
Ridgeway, Alexander..Greenwald
Ridgway, A. M.....Annandale
Riggs, C. E.....St. Paul
Rigler, Leo G.....Minneapolis
Rippert, J. A.....Duluth
Rishmiller, J. H.....Minneapolis
Risjord, J. M.....Fertile
Risser, E. D.....Winona
Ritchie, H. P.....St. Paul
Rivers, A. B.....Rochester
Roadman, I. M.....Ponsford
Roan, Carl M.....Minneapolis
Robb, Edwin F.....Minneapolis
Robbins, C. P.....Winona
Roberts, L. M.....Little Falls
Roberts, Thos. S.....Minneapolis
Roberts, W. B.....Minneapolis
Robertson, H. E.....Rochester
Robertson, J. B.....Cottonwood
Robertson, P. A.....Austin
Robilliard, C. M.....Faribault
Robilliard, W. H.....Faribault
Robinson, J. M.....Duluth
Robitshek, E. C.....Minneapolis
Rothford, W. E.....Minneapolis
Rodda, F. C.....Minneapolis
Rodgers, C. L.....Minneapolis
Roehlke, A. B.....Elk River
Rogers, John T.....St. Paul
Roholt, C. L.....Waverly
Rohwer, Christian Jacob....
.....Rochester
Rollins, F. H.....Saint Charles
Rood, D. C.....Duluth
Rose, J. T.....Lakefield
Rosen, S.....Minneapolis
Rosenberry, B. P.....Winona
Rosenow, E. C.....Rochester
Rosenthal, Robert.....St. Paul
Rosenwald, R. M.....Minneapolis
Rousseau, Victor....Maple Lake
Rothenberg, J. C.....Springfield
Rothrock, J. L.....St. Paul
Rothschild, H. J.....St. Paul
Rowe, O. W.....Duluth
Rowe, Paul H.....Minneapolis
Rowntree, L. G.....Rochester
Roy, J. A.....Red Lake Falls
Roy, Philemon.....St. Paul
Rudell, Gustave.....Minneapolis
Rudie, P. S.....Duluth
Ruhberg, George N.....St. Paul
Rumpf, C. W.....Faribault
Rumpf, W. H.....Faribault
Russell, Herman.....St. Paul
Rutherford, W. C.....St. Paul
Rutledge, L. H.....Detroit
Ryan, John J.....St. Paul
Ryan, Mark E.....St. Paul
Ryan, J. W.....Duluth

Saar, W. G.....Hutchinson
Sager, William Warren.....Rochester
Sanderson, A. G.....Granite Falls
Sanderson, E. T.....Minneota
Sanford, A. H.....Rochester
Sargent, H. L.....Fergus Falls
Satersmoen, Theo..Pelican Rapids
Sather, Allen.....Fosston
Sather, E. R.....Alexandria
Satterlund, Victor.....St. Paul
Savage, F. J.....St. Paul
Sawatzky, Wm. A....Minneapolis
Sawyer, H. P.....Goodhue
Schaaf, F. H. K.....Minneapolis
Schaefer, S.....Winona
Schatz, F. J.....St. Cloud
Schefcik, J. F.....Minneapolis
Scheldrup, N. H.....Minneapolis
Scherer, C. A.....Duluth
Schlesselman, J. T.....Mankato
Schlutz, Fred W.....Minneapolis
Schmidt, P. A.....Good Thunder
Schmidt, W. R.....Glencoe
Schmitt, A. F.....Minneapolis
Schmitt, Earl I. G.....Rochester
Schmitt, S. C.....Minneapolis
Schnanenberger, G..Rollingstone
Schneider, H. A.....Jordan
Schneider, J. P.....Minneapolis
Schoch, J. L.....New Ulm
Schoch, R. B.....St. Paul
Scholpp, A. W.....Hutchinson
Schons, E.....St. Paul
Schottler, G. J.....Dexter
Schroeder, C. H.....Duluth
Schuldt, F. C.....St. Paul
Schultz, J. A.....Albert Lea
Schulz, Irwin.....Rochester
Schulze, Albert G.....St. Paul
Schussler, Otto F....Minneapolis
Schwartz, A. H.....Duluth
Schwartz, Virgil J...Minneapolis
Schwyzer, Arnold .....St. Paul
Schwyzer, Gustav ...Minneapolis
Scofield, C. L.....Benson
Scott, J. W.....St. Charles
Seaberg, J. A.....Minneapolis
Seashore, D. E.....Duluth
Seashore, Gilbert....Minneapolis
Seham, Max .....Minneapolis
Seifert, Otto J.....New Ulm
Selleseth, Iver.....Minneapolis
Senkler, G. E.....St. Paul
Senn, E. W.....Owatonna
Shafter, Royce R.....Rochester
Shaleen, A. W.....Hallock
Shannon, S. S.....Crosby
Shannon, W. Ray.....St. Paul
Shapere, A. D.....St. Paul
Shapiro, E. Z.....Duluth
Shapiro, Morse J.....Minneapolis
Shedlov, A.....Gully
Sheldon, W. D.....Rochester
Shelland, J. T.....Ada
Shellman, John L.....St. Paul
Shelver, H. J.....Ortonville
Sheppard, Fred .....Hutchinson
Sheppard, P. E.....Hutchinson
Sherman, C. H.....Bayport
Sherman, C. L.....Luverne
Sherping, O. Th.....Fergus Falls
Sherwood, G. E.....Kimball
Shillington, M. A.....St. Paul
Shimonek, Anton.....St. Paul
Shippey, Stuart Hunter.....Rochester
Shrader, E. E.....Watertown
Shrader, J. S.....Springfield
Shulean, Nellie S.....Cambridge
Silvernail, F.....Elmore
Simison, C. W.....Hawley
Simon, B. F.....St. Paul
Simon, Geo. H.....St. Paul
Simon, Harold Ewart..Rochester
Simons, Bern. H.....Chaska
Simons, Edwin J.....Swanville
Simons, Jalmar.....Minneapolis
Simpson, E. D.....Minneapolis
Simpson, J. D.....Minneapolis
Siperstein, D. M.....Minneapolis
Sistrunk, W. E.....Rochester
Sivertsen, Andrew...Minneapolis
Sivertson, Ivar .....Minneapolis
Skinner, H. O.....St. Paul
Slater, S. A.....Worthington
Slattery, P. A.....Red Lake
Slocumb, J. A.....Plainview
Slocumb, Maude S...Minneapolis
Slyfield, F. F.....Duluth
Smallwood, J. T.....Worthington
Smersh, F. M.....Owatonna
Smersh, J. F.....Owatonna
Smith, A. M.....Minneapolis
Smith, Arthur E.....Minneapolis
Smith, B. A.....Crosby
Smith, B. F.....St. Peter
Smith, C. M.....Duluth
Smith, E. H.....Bemidji
Smith, E. K.....Duluth
Smith, F. D.....Kasson
Smith, F. L.....Rochester
Smith, Homer R.....Minneapolis
Smith, L. G.....Montevideo
Smith, M. W.....Red Wing
Smith, Newton D.....Rochester
Smith, Norman M....Minneapolis
Snell, Albert M.....Rochester
Snyder, G. W.....St. Paul
Soderlind, A. .....Minneapolis
Sogge, L.....Windom
Sohlberg, Olof.....St. Paul
Sohmer, A. E.....Mankato
Solhaug, S. B.....Minneapolis
Souba, Fred J.....Minneapolis
Spicer, F. W.....Duluth
Sprafka, J. M.....St. Paul
Spratt, C. N.....Minneapolis
Spurzem, R. J.....Anoka
St. Clair, G. G.....Duluth
Stacy, L. J.....Rochester
Staley, J. C.....St. Paul
Stangl, Fred.....St. Cloud
Stangl, Phillip E.....St. Cloud
Stanley, C. R.....Worthington
Staples, H. L.....Minneapolis
Stark, W. B.....Rochester
Steffens, L. A.....Red Wing
Steiner, I. W.....Winona
Stemsrud, A. A.....Dawson
Stephan, E. L.....Hinckley
Sterner, E. G.....St. Paul
Sterner, O. W.....St. Paul
Stevens, F. A.....Lake Elmo
Stevenson, Frank W..Minneapolis
Stewart, A. B.....Owatonna
Stewart, Alexander.....St. Paul
Stewart, C. A.....Minneapolis
Stewart, R. I.....Lindstrom
Stierle, Adolph, Jr.....St. Paul
Stinnette, S. E.....St. Paul
Stinson, John Wesley..Rochester
Stocking, Fred F.....Milaca
Stolpestad, H. L.....St. Paul
Stomel, Joseph .....Minneapolis
Stowe, A. J.....Rush City
Strachauer, A. C.....Minneapolis
Strathern, F. P.....St. Peter
Stratte, A. K.....Pine City
Strickler, A. F.....Sleepy Eye
Strickler, May.....Sleepy Eye
Strickler, O. C.....New Ulm
Strobel, W. G.....Duluth
Strout, E. S.....Minneapolis
Strout, G. Elmer....Minneapolis
Stuart, A. B.....Cloquet
Stuhler, Louis G.....Rochester
Stuhr, Henry C.....Minneapolis
Stuhr, J. W.....Stillwater
Sturges, C. J.....Buffalo
Sukeforth, L. A.....Duluth
Sundt, M.....Minneapolis
Sutherland, C. G.....Rochester
Sutherland, H. M.....Ely
Sutton, Chas. S.....St. Cloud
Sutton, L. F.....Mazeppa
Swan, Theo. S.....Rochester
Swanson, Edwin O.....St. Paul
Swanson, John A.....St. Paul
Swanson, Roy E....Minneapolis
Swartwood, F. A.....Waseca
Swedenberg, A. W.....Thief River Falls
Sweeney, Arthur.....St. Paul
Sweetman, R. H.....Sauk Center
Sweetser, H. B.....Minneapolis
Sweetser, H. B., Jr...Minneapolis
Sweetser, Theodore..Minneapolis
Sweitzer, S. E.....Minneapolis
Swendseen, Carl J...Minneapolis
Swendson, J. J.....St. Paul
Swennes, O. S.....Wahkon
Swenson, Charles.....Braham
Swezey, B. F.....Buffalo
Sybilrud, H. W.....Bricelyn
Synhoist, Alfred Paul..Rochester

Taft, John O.....Minneapolis
Taft, Walter L.....Minneapolis
Tanner, A. C.....Minneapolis
Tanquist, E. J.....Alexandria
Taylor, A. C.....Duluth
Taylor, C. W.....Duluth
Taylor, H. L.....St. Paul
Taylor, Rood.....Minneapolis
Taylor, Wm. J.....Pipestone
Teisburg, C. B.....St. Paul
Tennyson, Theo.....Minneapolis
Ternstrom, O. H.....Minneapolis
Thabes, J. A.....Brainerd
Thimsen, N. C..Blooming Prairie
Thomas, Geo. E.....Minneapolis
Thomas, Geo. H.....Minneapolis
Thomas, Gilbert J...Minneapolis
Thompson, Albert.....St. James
Thompson, J. W.....Rochester
Thompson, V. A.....Marine-on-St. Croix
Thordarson, Theo.....Minneota
Thoresen, Th.....Brooklyn, N. Y.
Thornby, H. J.....Moorhead
Thorson, E. O.....Luverne
Thysell, F. A.....Moorhead
Tibbetts, M. H.....Duluth
Tiber, L. J.....St. Paul
Tiedeman, J. D.....Heron Lake
Tiedemann, Elmer J.....Adrian
Tierney, C. M.....Granger
Tilderquist, D. L.....Duluth
Tilton, Albert J.....Alden
Tingdale, A. C.....Minneapolis
Tofte, Josephine .....Crookston
Torkelson, P. T.....Lyle
Towers, F. E.....Minneapolis
Townsend, D.....Brooten
Traeger, C. A.....Faribault
Tregilgas, H. R.....S. St. Paul
Trueman, Harold S...Minneapolis
Trutna, Thos. J.....Silver Lake
Tunstead, Hugh J...Minneapolis
Tuohy, E. L.....Duluth
Turnacliff, D. D.....Minneapolis
Turnbull, F. M.....Duluth
Turnbull, Robert.....Fosston
Tuttle, Thos. D.....St. Paul
Tweedy, G.....Winona
Tyrrell, C. C.....Minneapolis

Ulrich, Henry L.....Minneapolis
Undine, A. Clyde....Minneapolis
Urberg, S. E.....Duluth
Utley, J. O.....Montrose

Vadheim, A. L.....Tyler
Vail, James B.....Henning
Valentine, W. H.....Tracy
Van de Steeg, Wm. G....Biwabik
Van Slyke, Chas. A.....St. Paul
Van Valkenburg, F. W.....Long Prairie
Vercellini, C. E.....Duluth
Vigen, J. G.....Fergus Falls
Vik, Melvin.....Onamia
Vinson, P. P.....Rochester
Vogel, Joseph H.....New Ulm
Voger, Emile O.....Minneapolis
Vogtel, Melvin A....Minneapolis
Vollum, E. O.....Albert Lea
Von Berg, J. P.....Albert Lea
Von Lachum, W. H.....Rochester
Vonder Weyer, Wm.....St. Paul
Vrooman, F. E.....St. Francis

Waas, Charles William..St. Paul
Wagener, H. P.....Rochester
Wald, R. H.....St. Paul
Waldie, Geo. McL.....Wabasha
Waldron, Carl W.....Minneapolis
Walker, A. E.....Duluth
Walker, G. H.....St. Paul
Walker, R. E.....St. Paul
Waller, Jas. D.....Wilmont
Wallinga, John H.....St. Paul
Walters, B. Frank.....St. Paul
Walters, Franklin R.....Battle Creek, Mich.
Walters, H. W.....Rochester
Wanous, E. Z.....Minneapolis
Ward, A. W.....Minneapolis
Warham, J. J.....Minneapolis
Warner, E. F.....St. Paul
Warnock, R. W.....St. Paul
Warren, C. L.....Le Roy
Warren, E. L.....St. Paul
Warren, F. S.....Faribault
Warren, J. W.....Faribault
Warwick, Margaret .....St. Paul
Watson, F. G.....Worthington
Watson, J. A.....Minneapolis
Watson, John D.....Holdingford
Watson, N. M....Red Lake Falls
Wattam, G. S.....Warren

Way, O. F.....Claremont
Webb, R. C.....Minneapolis
Webber, Edward E.....Proctor
Webber, Isaac M.....Rochester
Weber, M. L.....Duluth
Webster, H. E.....Duluth
Weir, J. D.....Beardsley
Weir, J. F.....Rochester
Weiser, Geo.....New Ulm
Weisman, S. A.....Minneapolis
Welch, M. C.....St. Paul
Wellcome, J. W. B....Sleepy Eye
Welles, H. J.....Minneapolis
Wentworth, A. J.....Mankato
Werner, N. L.....Red Wing
Werner, O. S.....St. Hilaire
Westerman, F. C....Montgomery
Wethall, A. G.....Minneapolis
Weum, T. Wm.....Minneapolis
Wheeler, D. W.....Duluth
Wheeler, M. W.....St. Paul
Whetstone, Marg. S..Minneapolis
Whitacre, J. C.....St. Paul
Whitcomb, Ed. H.....St. Paul
White, J. S.....St. Paul
White, Marx S.....Minneapolis
Whitmore, F. W.....St. Paul
Whitney, A. W.....St. Paul
Whitten, Merritt B....Rochester
Widen, W. F.....Minneapolis
Wiese, H. F. B.....Minneapolis
Wilcox, Archa E.....Minneapolis
Wilcox, M. Russell..Minneapolis
Wilder, R. M.....Rochester
Wilkinson, Henry Fielding..
.....Rochester
Wilkinson, Stella.....Duluth
Will, W. W.....Bertha
Willcutt, Clarence...Minneapolis
Williams, Clayton.....St. Paul
Williams, L. A.....Slayton
Williams, Robert....Minneapolis
Williams, R. J.....Pine River
Williams, R. V.....Rushford
Williamson, Carl S.....Rochester
Willius, F. A.....Rochester
Willson, Hugh S.....Minneapolis
Wilmot, H. E.....Litchfield
Wilson, C. E.....Blue Earth
Wilson, L. B.....Rochester
Wilson, R. H.....Harmony
Wilson, Warren.....Northfield
Wilson, W. E.....Northfield
Wilson, W. F.....Lake City
Wiltrout, I. Geo.....Oslo
Winberg, O. K.....Lake Park
Winnick, J. B.....St. Paul
Winter, J. A.....Duluth
Wiseman, R. L.....Pine City
Witham, C. A.....Minneapolis
Wittich, F. W.....Minneapolis
Wohlrabe, A. A.....Minneapolis
Wold, K. C.....St. Paul
Wolfe, H. H.....St. Paul
Woltman, H. W.....Rochester
Wood, Douglas F....Minneapolis
Wood, H. G.....St. Paul
Woodard, F. R.....Minneapolis
Woodruff, C. W.....Chatfield
Woodworth, Elizabeth .....
.....Minneapolis
Workman, H. M.....Tracy
Workman, W. G.....Tracy
Wray, W. E.....Campbell
Wright, C. B.....Minneapolis
Wright, C. Darcy....Minneapolis
Wright, C. O.....Luverne
Wright, Franklin R..Minneapolis
Wynne, H. M. N.....Minneapolis

Ylvisaker, L. S.....St. Paul
Yoakem, Howard Haynes...
.....Rochester
Yoerg, O. W.....Minneapolis
Young, T. O.....Duluth
Young, V. A.....Duluth

Zander, C. H.....St. Paul
Zaworske, E. A.....Minneapolis
Zimbeck, R. D.....Maynard
Zimmerman, H. B.....St. Paul
Ziskin, Thomas.....Minneapolis
Zlatovski, Michael.....Duluth